

Conference Proceedings

The 4th Asian Conference on Clinical Pharmacy
- Progress Reports and Issues of Clinical Pharmacy
Education and Practice in Asian Countries -

July 24 ~ 26, 2004
Seoul, Korea

Hosted by : Korean College of Clinical Pharmacy
Sookmyung Women's University
Sponsored by : Korean College of Clinical Pharmacy
Korean Pharmaceutical Association
Japanese Society of Hospital Pharmacists
Chinese Pharmaceutical Association
American College of Clinical Pharmacy

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Program at a Glance

July 24, 2004 (Saturday)

8:00-10:00	11:00 – 13:00	13:00- 14:30	14:30 - 18:00	18:00 – 20:00
<i>ACCP Board Meeting (Hilton Hotel, Topaz)</i>	Registration & Lunch	Opening & Keynote Speech	Symposium I (Education Session)	Welcoming Party (Campus)

July 25, 2004 (Sunday)

9:00-11:00	11:00-11:40	11:40-12:00	12:00-13:00	13:00 - 16:00	16:00-17:30	18:30 – 21:00
Workshops	Plenary Session	Oral Presentation	Lunch	Symposium II (Practice Session)	Poster	Banquet (Hilton Hotel, Convention Center)

July 26, 2004 (Monday) : *Site Tour (Optional)*

9:00-16:00
Hospital & Pharmacy Site Tour

Scientific Program Schedule & Location

July 24 (Sat)

At Gemma Hall

Time	Lecture Titles	Speakers
11:00 – 13:00	Registration & Lunch	
Opening & Keynote Speech		
Moderator: Kwang Il Kwon, Ph.D., Chungnam National University, Korea		
13:00 – 14:30	Opening address	Hyun Taek Shin, Pharm.D. President of ACCP, Korea
	Congratulatory address	Hee Mok Won, Ph.D. President, Korean Pharmaceutical Association
	Keynote Speech : Educational renovation in US for pharmaceutical care	Joseph O. Dean, Ph.D. Samford University, USA
Symposium I - Education Session		
“Progress Reports and Issues of Clinical Pharmacy Education and Practice in Asian Countries”		
Korean Session		
Moderator: Charles Sands, Pharm.D., Samford University, USA		
14:30 – 14:45	Educational requirements for new practice regulations	Hyun Taek Shin, Pharm.D. Sookmyung Women’s University, Korea
14:45 – 15:00	Planning for 6-years entry-level pharmacy curriculum	Bong Kyu Yoo, Pharm.D., Ph.D. Yeungnam University, Korea
Japanese Session		
Moderator: Hye-Sun Kwak, PharmD., Ph.D., Chosun University, Korea		
15:00 – 15:30	Development of PBL (Problem Based Learning) in which Japanese hospital pharmacists participate	Yukata Gomita, Ph.D. Okayama University Medical School, Japan
15:30 – 16:00	The pharmacy education reform in Japan and an improvement of the clinical pharmacy education at Meijo University	Kazuhisa Matsuba, Pharm.D., Ph.D. Meijo University, Japan
16:00 – 16:30	Coffee Break	
American, Canadian, and Thailand Session		
Moderator: Zhu zhu, M.Sc., Peking Union Medical College Hospital, China		
16:30 – 17:00	Sahmyook University and Loma Linda University Schools of pharmacy partnership for clinical pharmacy education	Bruce L. Currie, Ph.D. , Loma Linda University, USA & Namjoo Ha Lee, Ph.D. , Sahmyook University, Korea
17:00 – 17:30	Pharmacy at University of British Columbia: committed to a partnership shaping the future of health in British Columbia	Robert Sindelar, Ph.D. University of British Columbia, Canada
17:30 – 18:00	Development of pharmaceutical education emphasizing on pharmaceutical care: Thailand experience	Paveena Sonthiosombat, Pharm.D. Naresuan University, Thailand Sutthiporn, Pattharachayakul, Pharm.D. Prince of Songkla University, Thailand Chalerm Sri Pummangura, Ph.D. Mahidol University
Welcoming Party (at Campus)		
18:00-20:00	Buffet dinner	All participants

July 25 (Sun)

At Gemma Hall

Time	Titles	Tutors
Workshops		
9:00-11:00	Development and assessment of innovative clinical programs (<i>Room:B106</i>)	Alan Lau, Pharm.D. University of Illinois, USA
	Teaching Evidence Based Practice in pharmacy education (<i>Room:B109</i>)	Timothy E. Welty, Pharm.D. Samford University, USA
	Developing pharmaceutical informatics for DUR program (<i>Room:B112</i>)	Hyun Taek Shin, Pharm.D. Sookmyung Women's University, Korea
	Continuing education program of pharmacists in faculty of pharmacy, Mayjo University (<i>Room:B111</i>)	Hiro-o Ishihara, Ph.D. Meijo University, Japan
Plenary Session for Hot Issues		
Moderator: Mikio Nishida, Ph.D. , Faculty of Pharmacy, Meijo University, Japan		
11:00 – 11:40	National policies and programs to improve medication safety in US	Edward Armstrong, Pharm.D. University of Arizona, USA
Oral Presentations		
Moderator: Sutthiporn Pattharachayakul, Pharm.D. , Prince of Songkla University, Thailand		
11:40 – 12:00	Helpful hints for Publishing Scientific Articles	Robert Schrimsher, Ed.D. Samford University, USA
12:00 – 13:00	Lunch	
Symposium II – Practice Session		
“Progress Reports and Issues of Clinical Pharmacy Education and Practice in Asian Countries”		
Moderator: Syed azhar Syed Sulaiman, Ph.D. , University Science Malaysia, Malaysia		
13:00 – 13:30	Pharmacist's intervention in anticoagulation therapy in hospitals: experience and outcomes	Kyung Eop Choi, Pharm.D. Samsung Medical Center, Korea
13:30 – 14:00	Medication teaching activities in community pharmacies of Korea	Byung Lim Min, R.Ph. Medical Heemin Pharmacy, Korea
14:00 – 14:30	Clinical application of pharmacogenetics: what is the future?	Charles Sands, Pharm.D. Samford University, USA
Moderator: Min-Hee Kang, Pharm.D. , College of Pharmacy, Chungbuk National University, Korea		
14:30 – 15:00	Development of clinical pharmacy with the experience of clinical medicine	Zeng Renjie, B.S. The General Hospital of Cheng-du Military Region, China
15:00 – 15:30	The practice and understanding of integrated pharmaceutical care in Shanghai	Chun-Fang Yao, MD Shanghai Changhai Hospital, China
15:30 – 16:00	Expanding role of clinical pharmacist in poisoning cases: an overview role of pharmacist at National Poison Center in University Science Malaysia	Syed azhar Syed Sulaiman, Ph.D. College of Clinical Pharmacy, University Science Malaysia, Malaysia
Poster session (at Lobby in front of Gemma Hall)		
16:00 – 17:30	Poster presentations (Standing presentation by presenters)	All presenters and participants
Banquet (at Hilton Hotel Convention Center)		
18:30 – 18:40	Closing Remarks	Hyun Taek Shin, Pharm.D. President of ACCP, Korea
18:40 – 21:00	Dinner & Entertainment (electronic string music, talent shows)	Musicians, pharmacy school students, each country representatives

July 26 (Mon)

Time	Titles
9:00 – 16:00	Hospital & Pharmacy Site Tour (<i>Optional</i>) 1. Seoul National University Hospital, Community pharmacy 2. Samsung Medical Center, Community Pharmacy 3. Asan Medical Center, Community Pharmacy

Welcoming address

Welcoming address by Chairman, 4th Asian Conference on Clinical Pharmacy

Hyun Taek Shin, Pharm.D.

*President, Asian Conference of Clinical Pharmacy and
Chairman, Organizing Committee of 4th ACCP Meeting*

On behalf of enormous efforts of member countries, we have successfully organized 4th meeting of ACCP here in Seoul. With more member countries of Malaysia and Thailand, we are all pleased to get together here again to share the experiences and progresses of clinical pharmacy practice, education and research in Asian countries.

Although we do have this 4th meeting one year later the originally scheduled year of 2003, we are now free from the previous problem of SARS and ready for opening our hearts and brains for promoting clinical pharmacy in Asia.

Today, there are many new issues and problems we are very much concerned with directly or indirectly. Firstly, we are watching pharmacy education in Japan and Korea to be changed in next several years. Entry-level 6 years pharmacy curriculum is being implemented in Japan and also being planned by governmental agency in Korea. The major objective for this educational renovation is definitely to improve the quality of pharmaceutical service by adding clinical pharmacy curriculum to the existing curriculum. Secondly, we are now watching strong social demands and concerns about medication safety in all drug use processes in community and hospital settings.

Recent novel reports from US, UK and other developed countries describing fatal adverse drug events have stimulated some countries to develop risk management system such as medication management standards including DUR programs. Korea is the first country who is adopting this risk management system on national level by benchmarking US system.

Many worldwide issues on healthcare system are pertaining to clinical pharmacy issues and deemed to be solved by developing clinical pharmacy education and practice in many settings.

For this 4th meeting in Seoul, we have many colleagues and speakers who will give us great ideas and inspirations and also increased numbers of scientific presentations over 50. For special interest group activities, we are also providing workshop session with 4 specific topics.

This new program feature of ACCP meeting will be surely beneficial for us to share new ideas and experiences between members and get reach to more practical communications and collaborations between countries.

As the chair of 4th ACCP meeting, I wish all the participants enjoy the program and feel comfortable in exploring Korean pharmacy and culture.

Keynote Speech

Keynote Speech

Educational renovation in US for pharmaceutical care

Joseph O. Dean, Jr., Ph.D.

*Dean and Professor, McWhorter School of Pharmacy, Samford University, Birmingham,
Alabama, USA*

Pharmaceutical Care (PC) emerged in the United States as a philosophy of pharmacy practice in the late 1980s and has matured from a theoretical model to the preferred approach to delivering patient care by pharmacists. Implications of this transformation in pharmacy have affected all facets of the profession. Both the day-to-day practices of pharmacists have changed as well as how pharmacists are educated. Pharmacy educators were challenged to rethink what they teach and how it is taught. Responses to the opportunities PC brought to pharmacy education have included redesign of curricula, changes in learning strategies by educators, renovation of practice models by teacher/practitioners and emphases on knowledge and skills associated with clinical pharmacy practice. Many challenges remain, including overcoming a widespread lack of acceptance of PC by the public and practicing pharmacists.

Educational Renovation in U.S. for Pharmaceutical Care

Joseph O. Dean, Jr., Ph.D.
Dean and Professor
McWhorter School of Pharmacy
Samford University
Birmingham, Alabama U.S.A.

Asian Conference on Clinical Pharmacy
Seoul, Korea
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Pharmaceutical Care is...

- A practice philosophy for pharmacists
 - Patient focused practice
 - Team delivered health care
 - Comprehensive knowledge and information required
- A curriculum mandate for educators
 - Knowing "WHAT" (content)
 - Knowing "HOW" (application)

How Long Has "PC" Been Around?

- Hepler CD and Strand LM, *Opportunities and responsibilities in pharmaceutical care*. Am J Pharm Educ., **53**, 7S-15S (1989)
- Hepler CD and Strand LM, *Opportunities and responsibilities in pharmaceutical care*. Am J Hosp Pharm., **47**, 533-43 (1990)

Pharmacy Education

- Focus changes from product to patient
- Understanding of disease states
- Ability to assess patient condition
- Interpretation of patient specific data
- Communication
- Team collaboration
- Evidence Based Care (EBC)
- Assessment based on outcomes

Definition of Pharmaceutical Care

"Pharmaceutical Care is a patient-centered, outcomes oriented practice that requires the pharmacist to work in concert with the patient and the patient's other healthcare providers to promote health, to prevent disease, and to assess, monitor, initiate, and modify medication use to assure that drug therapy regimens are safe and effective."

Ref: Principles of Practice for Pharmaceutical Care
www.aphanet.org/pharmcare/prinprac.html

Challenges/Opportunities

- Movement from theory to practice
- Re-educating faculty
- Identifying/developing models of PC practice
- Governmental/legal constraints
- Cultural barriers
- Compensation for non-product associated services

U.S. Pharmacy Education...

The Accreditation Council for Pharmacy Education (ACPE) expects schools to commit to Pharmaceutical Care as the template for the pharmacy curriculum.

Ref: Accreditation Standards and Guidelines for the Professional Program in Pharmacy Leading to the Doctor of Pharmacy Degree Adopted June 14, 1997. Accreditation Council for Pharmacy Education, Inc., Chicago, Illinois, USA

Yet to come...

- Widespread acceptance of PC as the standard of care in community-based practices...by patients and pharmacists.
- Transformation of U.S. faculty attitudes to wholehearted adoption of PC as the primary focus of their teaching.
- Validation of PC as an effective quality assurance and cost effective model of practice.

Responses by U.S. Schools

- Curriculum redesign
- Emphasis on drug information access and utilization
- Faculty development in learning strategies
- Practice renovations to create PC models
- More clinical laboratory emphasis
- Patient assessment laboratories
- Certification/training in immunization
- Certification/training in Basic Cardiac Life Support (BCLS)
- Increased communications training

Thank You!

Symposium I (Education Session)

Symposium I-Education Session : Korea

Educational requirements for new practice regulations and planning for 6 years entry-level pharmacy curriculum

Hyun Taek Shin¹, Pharm.D., Bong Kyu Yoo², Pharm.D., Ph.D.

¹ *College of Pharmacy, Sookmyung Women's University, Korea*

² *College of Pharmacy, Yeongnam University, Korea*

Although the pharmacy education has been maintained without significant changes over time, the pharmacy practice in Korea has been significantly changed since new prescription law separating prescribing and dispensing functions between physicians and pharmacists in drug use process was implemented in 2000. By the law, pharmacists are required to perform drug use evaluation prior to dispensing medications and also medication teaching and counselling for patients. However, the presumed professional activities of pharmacists to comply with these requirements have been sub optimal due to the insufficient pharmacy education and training system and many other reasons. As the result, the effectiveness of new prescription law has been questioned and debated by the public and other healthcare professionals.

According to the recommendations of Presidential Study Commission on Pharmacy, 6-year program of pharmacy curriculum, the implementation of Good Pharmacy Practice Standards for both inpatients and outpatients and Drug Utilization Review(DUR) program for improving medication safety are being planned by the governmental agency and pharmaceutical societies. Lately, the issue of medication safety has been raised by the congress and consequently by the public on behalf of recent national research report showing significant numbers of inappropriate drug prescriptions which may result in serious adverse drug reactions. By the recommendation of the congress, the national committee of DUR board was formulated to implement DUR program nationwide to assure medication safety and also improve the financial status of national health insurance by preventing inappropriate and unnecessary drug uses. Prospective and/or retrospective DUR practice will be mandatory for virtually all hospitals and pharmacies and also for drug claims adjudication by Health Insurance Review Agency in near future. Since the infrastructure of information technology and telecommunications is so advancing in the country, this program will be efficiently implemented with various types of sophisticated DUR systems including POS(point of sale) prospective DUR in community pharmacies and CPOE(computerized prescriber order entry) DUR in hospitals.

This new national program will require pharmacists use more professional knowledge bases and clinical skills for easy and efficient communications with medical professionals and therefore will create significant impact on over all feature and minutes of pharmacy practice toward more positive future of pharmacy profession in Korea as it has happened in US.

For pharmacy profession to cope with this dynamic advance toward improving the quality of pharmaceutical services in general, urgent renovation of pharmacy practice and education is strongly required for not only for bright future of pharmacy profession itself but also better patient care in our society.

Educational renovation for 6 years is now underway by the government. National consensus has been made by the efforts of Korean Pharmaceutical Association and Ministry of Health and Welfare and Ministry of Education is now taking the role of finalizing the national policy and regulation for 6 year program. It is expected that the process of regulatory amendment will take another year and more efforts may be needed to clarify all other issues regarding social impact, opponent professional groups and curriculum contents. However, there is no doubt for this renovation of pharmacy education to be blocked by any reasons or oppositions. Most updated contents of the proposed model curriculum include additional didactic courses for clinical pharmacy, social pharmacy and biotechnology-applied sciences and practice training in hospitals, community pharmacies and pharmaceutical industries.

Along with curricular change, continuing education system for practicing pharmacists will be more expanded than before in contexts of contents and mandatory credit hours.

Symposium I-Education Session : Japan

Development of PBL (Problem Based Learning) in which Japanese hospital pharmacists participate

Yutaka GOMITA¹, Ritsuko TANIGUCHI²

¹Department of Hospital Pharmacy, Okayama University Medical and Dental School

²Center for Clinical Pharmacy Practice, School of Pharmacy, Shujitsu University, Okayama, Japan

Although not early, the clinical pharmacy education in Japan has been gradually and steadily advancing in pharmacy school. However, it is still deficient in cultivating the thinking ability of students about the method of pharmaceutical care to patients. It is necessary for the students to have a pre-experience in assumed clinical situation.

So, we tried to establish the Problem Based Learning (PBL) with the role-playing, in which hospital pharmacists participated, in our clinical pharmacy education. This education type is characterized by problem solution and student participation with positive manner.

In the present study, the process of PBL consisted of grasping the pathological situation as well as the pharmacotherapy of the diseases, extracting the problems in the pharmaceutical care, and discussing them together in small groups, and practicing the role-playing as a pharmacist. In the role-playing, the hospital pharmacists participated as simulated patients. In the scenarios of PBL, diseases such as diabetes mellitus and bronchial asthma were adopted. After the PBL, we carried out questionnaire survey to the students for evaluating the PBL trial. A high evaluation was obtained in this questionnaire from the pharmacy school students, especially in learning the communication skill through the role-playing and cultivating the thinking ability about the pharmaceutical care. From these results, it suggests that the PBL is very useful in the present clinical pharmacy education in Japan.

Finally we would like to thank two professors of Mchorter School of Pharmacy, Samford University, Prof. Lander for his precious advisement, and Prof. Dean for his warm consideration.

Symposium I-Education Session : Japan

The Pharmacy Education Reform in Japan and an Improvement of the Clinical Pharmacy Education at Meijo University

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Pharmacy Education Reform:

The long pending issue for moving pharmacy education to 6-year period was settled this year. Japanese pharmacy education will enter into new century from 2006.

There has been much controversy among the Societies of Pharmacy (JPA and JSHP), education experts and Government (MHLW: the Ministry of Health, Labor and Welfare, MEXT: the Ministry of Education, Culture, Sports, Science and Technology) as to whether the term extension of the pharmacy education would be necessary for pharmacy education since 1993. An advisory committee summoned by MHLW had proposed six-year-period education in 1994. On the contrary, a cooperators committee for the reform at MEXT had other opposite opinions to reform for some reasons. In 2002, the Private and Public College of Pharmacy Societies and the Pharmaceutical Society of Japan also proposed the new model core curriculum for a pharmacy education, which has oriented to the clinical pharmacy including the practice experience in health care sites.

Finally, at the beginning of May 2004, Government passed the legislation to extend the educational period of pharmacy schools from 4-year to 6-year.

Reforming Clinical Pharmacy Education in Meijo University:

Meijo University has experienced 1-year graduate course of clinical pharmacy practice education during past twenty-eight years. In 2002, we reformed this course to Master course. This Master program provides specialist education intending to train clinical pharmacists, who work as health care giver. The features of the education are two kinds of backbones; Clinical Communication Skill and study of Pharmacotherapy with PBL. They have to be evaluated their communication skill abilities at OSCE in advance practicing clinical experience at hospital. The core of the program is more than 1 year of clinical experience practice at University Hospital affiliated with Meijo University. Graduate students study the drug therapy on patients with medical students there. Another feature of our reformed system is the Satellite Seminar Room for pharmacy graduate students, which set up in the Medical School. In this room, graduate pharmacy students, faculty staffs of pharmacy and medicine are usually able to associate freely.

Symposium I-Education Session : USA

**Sahmyook University and Loma Linda University Schools of
Pharmacy Partnership for Clinical Pharmacy Education**

Avis J. Ericson¹, Pharm.D., Bruce L. Currie¹, Ph.D., Namjoo Ha Lee², Ph.D.

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The Schools of Pharmacy at Sahmyook University, South Korea and Loma Linda University (LLU), California, USA are the only two pharmacy schools in the world-wide Seventh-day Adventist Higher Education System. These schools are forging a partnership to further the development of pharmacy education within the respective universities and to exchange ideas regarding curriculum, assessment, teaching methods, and scholarly activities. Faculty and student exchanges are also expected to develop as this cooperation matures. The School of Pharmacy, Sahmyook University was established in 1978 and has a B.S. in Pharmacy curriculum that provides eligibility for pharmacy licensure in South Korea. The School of Pharmacy, LLU was established in 2001 with the first class to graduate with the Doctor of Pharmacy (Pharm.D.) degree in 2006 with eligibility for pharmacy licensure in the U.S. Professor Ericson visited Sahmyook University in 2002, Sahmyook administrators visited LLU in 2003, and Dr. Lisa Beardsley, Vice Chancellor for Academic Affairs at LLU visited Sahmyook in 2003 as initial steps in the development of bilateral exchanges and cooperation. Professor Currie visited Sahmyook in July 2004 for further planning and development of this relationship. Professor Ha intends to spend a sabbatical leave at LLU beginning in March 2005. A formal cooperative agreement is being developed that is expected to be finalized later this year that will establish plans for curriculum development and faculty and student exchanges. Cooperative efforts in various aspects of the pharmacy professional education programs and research collaborations will be outcomes of these exchanges. Opportunities for elective pharmacy practice experiences for visiting students will be developed as well. This partnership is expected to be particularly important for the development of a Pharm.D. program at Sahmyook University in the near future.

Symposium I-Education Session : Canada

**Pharmacy at the University of British Columbia : Committed to a
Partnership Shaping the Future of Health in British Columbia**

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The Canadian Health Act of 1984 states that “All Canadians should have reasonable access to quality care regardless of where they live and how much they make.” Yet, higher drug prices, a continuing switch to newer drugs, and an overall increase in prescriptions all contribute to the

increase in drug expenditures. This presentation provides an overview of the Canadian health care debate along with the British Columbia perspective. Academic pharmacy is unique because we are factually conversant and practically capable to contribute to the entire life of a drug, from bench to bedside and back. A detailed discussion highlights some roles academia can play in helping to assure quality, sustainable health care and innovation. These roles include patient care, education, outcomes, research, innovation, bioinformatics, and health policy.

The presentation closes asking the following questions:

What are our next steps?

How do we forge productive, synergistic, and lasting partnerships among government, academia, the health professions, and industry?

What role can international collaborations play?

Symposium I-Education Session : Thailand

Development of pharmaceutical education emphasizing on pharmaceutical care: Thailand experience

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¹ Naresuan University, ² Prince of Songkla University, ³ Mahidol University, Thailand

Three new pharmaceutical education programs have currently been established in Thailand to serve the pharmaceutical care development. Firstly, a six-year curriculum, leading to the Doctor of Pharmacy (Pharm.D.) degree as the sole professional degree awarded in 1999 by Naresuan University. Students required to complete 6 clinical clerkship rotations in the final year of the program to assure that they will develop the technical skills, professional judgements and competencies necessary for entry into the pharmacy profession. In addition to Naresuan University, there are two more universities in Thailand that currently run this program. Secondly, Pharmacy Residency and Fellowship Training Program has been developed by The Pharmacy Council of Thailand since 2000 in order to provide intensive training in pharmaceutical care practice to the pharmacists. Prince of Songkla University and Naresuan University has currently adopted this program under supervision of The College of Pharmacotherapy. Area of Specialty that are available for training are internal medicine, infectious diseases, cardiovascular diseases, oncology, critical care and pediatrics. Lastly, the Pharmacy Council of Thailand has established the continuing pharmaceutical education program (CPE) since 2002 to ensure the competency of all pharmacists in Thailand to deliver the best knowledge and skills in pharmaceutical sciences in his/her specialties. The program allows a pharmacist to update his/her knowledge and skills by attending the pre-approved academic meeting or reading the pre-approved article-related to pharmaceutical sciences. At least 10 CPE hours yearly and a total of 100 CPE hours per 5 years must be achieved by a pharmacist prior to continue active status of his/her pharmacist license. Currently, at least 70-

80% of pharmacists participated in this program. In conclusion, pharmacy profession has been changing towards the more responsibility on patient care. Several in-depth education or training programs are provided in Thailand to facilitate the pharmacist facing the tremendous changes.

Plenary Session for Hot Issues

Plenary Session

National Policies and Programs to Improve Medication Safety in US

Edward Armstrong, Pharm.D.
University of Arizona, USA

Oral Presentation

Oral Presentation

Writing for Publications: Helpful Hints for Publishing Scientific Articles

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This presentation will focus on issues, problems, and helpful hints toward publishing scholarly journal articles. Discussion will include the following topics: details on writing an article, facts and myths of publishing, reasons for manuscripts being rejected, article formatting, qualities of good writing, helpful tools of the trade, overcoming writer's block, successful steps for article approval, sections of an article, the phases of the writing process, tips on proofreading, and other problematic areas.

Symposium II (Practice Session)

Symposium II-Practice Session : Korea

Pharmacist's intervention in anticoagulation therapy in hospitals: experience and outcomes

Kyung Eop Choi, Pharm.D.

Division of Pharmaceutical Services, Samsung Medical Center, Korea

Symposium II-Practice Session : Korea

Medication Teaching Activities in Community Pharmacies

Byung Lim Min, R.Ph.

Medical Heemin Pharmacy, Seoul, Korea

Since new prescription law of separating prescribing and dispensing functions was implemented in July 1, 2000, medication teaching activity has become the most important pharmaceutical service in community pharmacies. Although major components of medication information to be delivered to the patients are legally defined, medication teaching methods and contents have been variable depending on pharmacists' preferences.

Most medication teachings for patients are provided verbally with or without additional materials such as leaflets and audio-visual aids. Medication teaching activities by pharmacists have been evaluated by several consumer groups. Most studies have shown that over all quality of medication teachings in community pharmacies is far below the level that the public expects. There are many reasons for this outcome but major reason is deemed to be the absence of standardized guideline for medication teaching.

Therefore, a well-designed practice standard or guideline to be imposed by either professional groups or governmental agency is needed to improve the quality of medication teachings and consequently clinical outcomes of costly medications.

Symposium II-Practice Session : USA

Clinical Application of Pharmacogenetics: What is the future?

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Genetically controlled polymorphisms of drug-metabolizing enzymes, drug transporters, and drug receptors cause significant differences in human subjects in the efficacy and safety of many drugs. The inherited basis for these large interindividual variations is being elucidated at the level of the human genome by the field of pharmacogenomics. This new knowledge can be used not only to guide new drug discoveries but also to individualize drug therapy. For example, adverse drug reactions are a leading cause of death and are often attributable to differences among subjects in drug response. Through the application of the principles of pharmacogenetics and pharmacogenomics these high morbidity and mortality rates could possibly be reduced.

Symposium II-Practice Session : China

Development of Clinical Pharmacy with the Experience of Clinical Medicine

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The term “clinical” refers to the medical service just beside the beds of the patients and now is used in the reference to general practice in medicine, for example, clinical medicine, clinical science or clinic-place for specialized medical treatment. It is obvious that scholars share the same understanding toward the term “clinical”. In practice or in research, all performance under the name of “clinical” should be carried out to bedside. The success and the experience of Clinical science and clinical doctors give out strong proof on this.

Clinical doctors take up absolute minority in number as hospital service is provided for patients and medical service is one of the individualized services. It is the advance of the society to perfect specialty structure. Hospital pharmacists become the main body in providing patients with pharmaceutical care on the basis of clinical pharmacy, thus most hospital pharmacists should try to become clinical pharmacists.

Clinical science is a high tech with rich experience. Pharmacists with high technical titles, more education and high degrees should take the clinical work, which can result in the possible development of clinical pharmacy.

Scientific thesis and research, reflecting the content and level of the work in hospital, can play the role of guidance. It is regarded as the key change in hospital pharmaceutical work that clinical pharmaceutical thesis and research incline to dwell on clinical pharmaceutical treatment. Professional publications hold a valuable guidance in scientific development and are helpful to

professional staff. Many publications on hospital pharmacy or clinical pharmacy in our country are of instructive significance to hospital pharmacy, their content reveal the development of hospital pharmacy.

Clinical pharmacy should set up concerning medical documents with its own characteristics: 1. extractions of disease diagnosis related to drug therapy; 2. general analysis, selection of the most suitable drugs and brief explanations about the reason; 3. warning of the possible occurrence between drugs, between drugs and food; 4. program and performance of drug therapy; 5. suggestions on making related lab tests of drug therapy.

The technique of drug therapy should be stressed in the primary stage of clinical pharmacy. It should be especially emphasized that the directors of pharmacy department should try to renew the outlook and to be clinical pharmacists, the experts in clinical pharmacy, the qualified leader in this science and thus to make this science hopeful.

Symposium II-Practice Session : China

Practice and Experience in Integrated Pharmaceutical Care

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We have enriched and developed the foreign theory of pharmaceutical care and created the new concept of “Integrated Pharmaceutical Care”, thus facilitating the domestic colleagues to set off an upsurge of implementing pharmaceutical care. We took the lead in establishing a work model in China, in which the pharmacists go deep into the clinical work in a fixed unit for a long time, thus overcame the restriction due to limited establishment of pharmacists in hospitals and short of clinical pharmacists, which are the general condition present in both military and civilian hospitals at present, and enabled the limited staffs after short training to go deep into the clinical work and carry out clinical pharmacy and pharmaceutical care directly for the patients as quick as possible and enabled them to give full play to their professional technical knowledge in making policy of clinical pharmacotherapy and to help the doctors improve rational medication and level of clinical treatment. Up to 2003, the pharmacists of Shanghai Changhai Hospital participated in ward-round for 632 times in total, examined 2323 patients, answered inquiries of doctors, nurses and clinical patients for more than 500 person-times, participated in clinical case discussions of departments and whole hospital for 56 times and pharmaceutical consultation for 24 times and helped the clinical doctors discover, analyze and manage the drug adverse reaction for 231 case-times in total. We participated in emergency treatment of drug intoxication, helped doctors draw up treatment regimen, improved treatment aiming at the disease and success rate of treatment, and successfully cured 8 cases. We were the first to go out the hospitals in China, enabled the pharmaceutical care to extend from clinical patients to community people, carried out medication education from all directions and multi-levels and expanded the scope of pharmaceutical care. We provided strong technical guarantee for carrying out all-sidedly the pharmaceutical care in and out the hospital through establishing the network system of hospital pharmaceutical administration and information service based on a variety of network platforms. With the basic quality requirement of pharmaceutical care as the target, we established a model

of new-type hospital pharmaceutical education and initiated a series of teaching curriculums and continuous education courses to open up a road for training the reserve qualified personnel of pharmaceutical care. We carried out deeply the study on theory and administration of pharmaceutical care and established the related regulations and assessed criteria for perfecting implementation of pharmaceutical care, enabled pharmaceutical care to develop in depth. We have set up the journal “Pharmaceutical Care and Research”, the field for research and interchange of integrated pharmaceutical care. It has enhanced significantly the level of pharmaceutical care in China.

Symposium II-Practice Session : Malaysia

Expanding role of clinical pharmacist in poisoning cases: An Overview role of pharmacist at National Poison Center in University Science Malaysia

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University Science Malaysia College of Clinical Pharmacy, Malaysia

Clinical Pharmacists promote safe, appropriate and effective medication use for patients within the healthcare center around the world. By working as part of a health care team, they are able to closely monitor patient drug therapy and make recommendations on the selection of the best medication for a patient’s condition, the correct dose and duration of therapy. Clinical pharmacists can specifically tailor the medication choice or dose-form to be most appropriate for the patient. However, with the changing role of healthcare system, clinical pharmacists have broaden their wings in catering the needs in poisoning cases. They can specifically involved in management of poisoning cases and improved patient’s outcomes. In Malaysia, National Poison Centre, also known as Pusat Racun Negara (PRN) set up based on the services provided by the Intergrated Drug and Poison Information Services (IDPIS), Universiti Sains Malaysia since 1982. IDPIS evolves from several research activities carried out towards strengthening the health care services, particularly in the areas of information technology and informatics. With the mission to reduce the mortality, morbidity, cost and occurrence of poisoning in manner that strives for excellence, compassion and innovation, we have successfully educate, and improved patient’s outcomes in respect to poisoning cases. Currently nine pharmacists are handling the center which is also a WHO collaborative center for Drug and poison information center. We establish standards, provide education and training and promote innovation. National Poison Control Center Plays and expanded role in changing the role of clinical pharmacist the new healthcare system which takes leadership role in designing lifesaving resource. Currently there are 5 services being offered in the center namely drug and poison information services, research and documenting poisoning incidences, coordinating and conducting poison awareness and prevention education and carrying out analytical tests and interpretations of laboratory results. With the highly demanding world of healthcare, the pharmacists in the National Poison Center at University Science Malaysia have moved forward another step to provide world class management of poisoning cases and providing information to improve patient outcomes.

Poster Presentations

Poster Presentation - 01

Making efforts to promote Clinical Pharmacy Practice better

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Aim: To develop the hospital pharmacy as a service system where the patient can meet professional pharmacists and get advice about medication usage in an easy and inspiring way.

Method: A new style for drug dispensary as well as drug information service have been implemented for the outpatients.

Result:

1. Pharmacy was reconstructed completely into a patient-centered service. The dispensary was changed from “window style service” to “counter style service”, which is so called face-to-face service for the patients.
2. The individual drug list is provided to help the patients to understand the whole medicines treatment and the cost of every medicine.
3. The drug usage labeling is combined with a simple oral explanation to make sure that patients can follow the important usage directions exactly.
4. Specialized counseling pharmacists are available to answer the special questions based on each patient’s disease history and background.
5. The “Drug usage booklet” is delivered for recording the medication history and informing patients severer adverse effects and drug interactions with some precautions. This is especially useful for the elderly patients with chronic diseases.

Conclusion: The concept of pharmaceutical care has been prevailing accepted in China for many years. Our practice has been promoted by many hospital pharmacies, and will contribute to improve rational use of medicine in China.

Poster Presentation - 02

Post Marketing Surveillance for the Quality Evaluation of Several Drugs

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Drugs may play a major role in treatment of diseases, which are required to be safe, effective, stable and economic. Pharmacy department is one of the terminal links in the chain of marketing drugs circulation. It is her responsibility to ensure the drugs with high quality before to be accessed by patients. The production and circulation of generic drugs are

encouraged in China because of their affordable prices. For those generic drugs here, there are different levels of quality standards including pharmacopoeia standard, MOH standard and manufacture standard, etc. On the other hand, the proportion of the imported products or manufactured by joint venture are increased yearly. Facing to such serious competition of medication market and so many generic products, it is really tough for hospital pharmacists to select the most appropriate one for their hospitals and patients. The difference of quality would be found if those generics were examined according to the strict standards. The samples of 11 preparations post marketing, including troxerutin, metformin, sparfloxacin, cefradin, domperidon, aluminum phosphate, aluminum-magnesium hydroxycarbonate, flunarizine, ceftriaxone, calcium supplement, and parental antibiotics were evaluated in vitro or in vivo in this thesis, respectively. Compared with clinical trial, bioequivalence study, pharmaco-economic investigation and meta-analysis, it was found that the pharmaceutical evaluation in vitro appeared to have its own characteristics and superiorities. It may be used as the first choice for pharmacists before decision-making. In terms of the pharmaceutical evaluation in vitro, part of the following items were examined here for above samples respectively in Part One: content, uniformity of dosage unit, dissolution, related substances (decomposition or impurity), organic volatile residues, viscosity, color, clarity, pH, water content, polymer, fill-mass, suspension rate, stability, particulate matter in injection, adsorption and permeation, package and storage, price, label and labeling, seal of blister packaging and etc. The pharmacodynamics in vitro related to quality was investigated in Part Two. The first artificial model was an artificial stomach model, which was used to evaluate the dynamic neutralizing capacity of three generic products of aluminum phosphate gel. The second one was gastrointestinal model, which was used to study the bile acid-binding capacity between aluminum- magnesium hydroxycarbonate and sucralfate at different pH in vitro. The investigation on the changes of calcium in serum and urine after oral administered different brands of calcium supplement in healthy volunteers was included in Part Three. It was finally discussed the necessity, feasibility and clinical influence of post marketing surveillance on the quality of generic drugs used in hospitals. Because the difference among generic products was found, it was strongly suggested to pay more attention to this issue, either on quality evaluation for authorities or quality improvement of generic drugs for manufactures.

KEY WORDS - generic drugs, post-marketing surveillance, quality control, artificial models, bioequivalence

Poster Presentation - 03

Studies on Pharmacokinetics of Floxuridine in Patients with Trophoblastic Neoplasms

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Objective: To investigate the disposition of floxuridine(FUDR) in patients with trophoblastic neoplasms and the relationship between FUDR and 5FU preliminarily.

Methods: 12 patients with trophoblastic neoplasms were enrolled and randomly divided into a

FUDR or FUDR+KSM group respectively. FUDR was administered by an 8-hour constant intravenous infusion. Blood samples were obtained during the infusion and up to 50 min after the infusion. The concentrations of FUDR in serum were measured by reverse-phase high-performance liquid chromatography with a limit of detection at 0.001mg/L and a linearity range over 0.005-0.500mg/L. The pharmacokinetics of FUDR was assessed by a compartmental and noncompartmental model using the software WinNonlin version 1.5.

Results: FUDR distributed promptly in the patients after the infusion and the steady-state concentrations, ranged from 0.05 to 1 mg/L, which was achieved within 30min. After the end of the infusion, the FUDR concentration decreased rapidly (within 10 minutes) to about 3.26-21.85% of the concentration at the end of the infusion. A 3-compartment model described the disposition of FUDR. 5FU, the metabolite of FUDR, appeared rapidly in the serum after FUDR infusion, and the average M_{5FU}/M_{FUDR} (molar concentration of 5FU derived from FUDR in serum versus the simultaneous molar concentration of FUDR in serum) were stable at a range from 1.41-1.76 during the infusion, and then increased rapidly to 4.27 after the end of infusion. The Cl_{total} of FUDR decreased progressively as the dose was increased from 3.34-3.95mg/kg/h ($r=-0.8585$, $p<0.05$). In addition, the AUC ($r=0.8566$ $p<0.05$) increased more rapidly than the dose.

Conclusion: FUDR was eliminated primarily by a nonlinear process. FUDR was converted to 5FU extensively when administered by an 8-hour intravenous infusion.

Key Words - floxuridine; fluoracil; pharmacokinetics; trophoblastic neoplasms

Poster Presentation - 04

The investigation of tissue penetration for capecitabine and the pharmacokinetics analysis for tumor-selective accumulation of 5-FU in advanced breast cancer

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Objective: To measure and compare the penetration of capecitabine from the plasma compartment into tissue and the pharmacokinetics of its metabolizing into fluorouracil(5-FU) in patient with advanced breast cancer.

Method: 27 breast cancer patients received repeated doses of 1255mg/m² of capecitabine twice daily. Plasma, tumor and adjacent healthy tissue samples were collected. The concentration of capecitabine and its metabolite 5-FU were determined by HPLC. Fitting the concentration-time profile for capecitabine and 5-FU by pharmacokinetic model constructed with characteristics metabolism. The tissue distribution factor for capecitabine and 5-FU, and the AUC ratio of 5-FU/capecitabine in Plasma/Tumor/Adjacent Healthy Tissue respectively, both were calculated with PK parameters from model simulation.

Result: The capecitabine K_a were 3.667 h^{-1} , 2.945 h^{-1} and 3.063 h^{-1} in plasma, tumor and healthy tissue; The capecitabine AUC were $6.175 \text{ mg} \cdot \text{L}^{-1} \cdot \text{h}$, $7.045 \text{ ug} \cdot \text{g}^{-1} \cdot \text{h}$ and $3.970 \text{ ug} \cdot \text{g}^{-1} \cdot \text{h}$, and $T_{1/2}$ were 0.4640 h, 0.6105 h and 0.5965h in plasma, tumor and healthy tissue, respectively. The 5-FU AUC were $1.004 \text{ mg} \cdot \text{L}^{-1} \cdot \text{h}$, $10.181 \text{ ug} \cdot \text{g}^{-1} \cdot \text{h}$ and $3.426 \text{ ug} \cdot \text{g}^{-1} \cdot \text{h}$; the $T_{1/2}$ were 0.4336h, 0.9966h and 0.7701h in plasma, tumor and healthy tissue, respectively. The tissue distribution factor for capecitabine was 1.14 in tumor ($\text{AUC}_{\text{cap-Tumor}}/\text{AUC}_{\text{cap-plasma}}$) and 0.6429 in healthy tissue ($\text{AUC}_{\text{cap-HT}}/\text{AUC}_{\text{cap-plasma}}$). The tissue distribution factors for 5-FU was 10.14 in tumor ($\text{AUC}_{5\text{FU-Tumor}}/\text{AUC}_{5\text{FU-plasma}}$) and 3.41 in healthy tissue ($\text{AUC}_{5\text{FU-HT}}/\text{AUC}_{5\text{FU-plasma}}$). The AUC ratio of 5-FU/capecitabine in Plasma/Tumor/Healthy Tissue were 0.163, 1.445 and 0.863 respectively.

Conclusion: The simulation curves for the plasma and tissue concentration of capecitabine and its metabolite 5-FU can basically describe the activation process of capecitabine metabolizing to 5-FU and 5-FU elimination. There is similar distribution for capecitabine in plasma, tumor and healthy tissue. The distribution of 5-FU in tumor was found to be 10.14 times greater than that in plasma and 3.41 times greater than that in healthy tissue, respectively. It suggest that capecitabine preferentially metabolized to 5-FU in tumor tissue after oral administration of capecitabine.

Keyword - capecitabine, pharmacokinetics, 5-FU, Tissue distribution factor

Poster Presentation - 05

The value of 1,6-diphosphate fructose in HIE infants: a systematic review

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Objective: To evaluate the quality of clinical trial, and to quantify the effect on mortality and brain injury of 1,6-diphosphate fructose (FDP) administration in the management of hypoxic ischemic encephalopathy (HIE) patients.

Search Strategy: We searched the Cochrane Injuries Group trials register, Cochrane Controlled Trials Register, Medline, Embase and Cbmdisk. Reference lists of trials and review articles were checked.

Selection Criteria: Randomized controlled trials (RCTs) comparing FDP with no FDP, or with a physiological crystalloid solution, in HIE patients were included. RCTs taken mortality and the incidence of cerebral palsy, epilepsy and mental defect were selected in meta analysis.

Data collection and analysis: We collected data on the participants, method of randomization, mortality during treatment, incidence of sequel at the end of the trial, and quality of allocation concealment. The quality of RCTs was assessed with JADAD scale.

Main Results: We found 43 clinical trial on management of HIE with FDP, and all of them are Chinese reference. 35 clinical trials including 3130 participants used randomization in grouping. NONE of the 35 "RCTs" mentioned if blindness were carried out. In Jadad score, 12 of the 35 "RCTs" were as low as 0, 17 of them were 1, and 6 of them were 2. 6 trials were included in the meta analysis of death, which showed that the relative risk of death following FDP

administration was 0.50 (P=0.10, 95% confidence interval 0.21 to 1.16). 4 to 5 trials were included in the meta analysis of incidence of cerebral palsy, epilepsy and dementia. When intention to treat (ITT) analysis was adopted, the relative risk of FDP on cerebral palsy was 0.36 (0.19 to 0.89), on epilepsy was 0.74 (0.29 to 1.88), and on dementia was 0.21 (0.06 to 0.70). None of the clinical trial compared cost and adverse reactions between different groups.

Reviewers' conclusions: The quality of clinical trials on FDP using in HIE are poor. Few trials reported final indicator such as mortality and the incidence of sequela. Because high-quality RCTs are lack, no credible conclusion can be drawn from meta analysis of the low-quality RCTs. There isn't reference on the economics of FDP administration on HIE. Well-designed RCTs and economic evaluation are urgently needed to evaluate the value of FDP on the treatment of HIE.

Poster Presentation - 06

A Semi Automated SSCP Screening for Genetic Polymorphisms in the Dihydropyrimidine Dehydrogenase (DPD) Gene Associated with 5-Fluorouracil Toxicity; Pharmacists Role in Pharmacogenetic Study

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Pharmacists can help gene analysis with their background in biology, laboratory experience and specialized abilities. Dihydropyrimidine dehydrogenase (DPD) is the initial, rate-limiting enzyme in the catabolism of 5-fluorouracil (5FU), anticancer drug. A pharmacogenetic syndrome has been described in which DPD deficient patients are at risk for toxicity following administration of 5FU. The development of a highly, sensitive, simple and inexpensive method for rapidly screening for mutations in the gene that code for DPD (DPYD) is described. A non-RI semi automated single strand conformation polymorphism (SSCP) screening (Genephor SSCP, Amersham Bioscience Co.) provides a method for screening DNA samples for polymorphisms and mutations. Conditions were optimized for analysis of the 23 exons of the DPYD gene. The SSCP of 26 fragments representing the entire coding sequence of the DPYD gene including all splice acceptor and donor sequences was optimized. In order to verify the efficiency of the SSCP screening, samples with known mutations were analyzed on the system using the optimized conditions. The technique resolved the known DPYD polymorphisms we examined. In addition, a novel mutation (2303C>A, 768Thr>Lys) was identified in healthy Japanese. We conclude that the method we developed is a highly specific and sensitive screening method for rapidly detecting both known and unknown sequence variations in the DPYD gene, and should be useful for the future pharmacogenetic studies.

A study about preparation of ulinastatin pessary and the oxytocic action

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On quality of the pharmaceuticals formulated in hospital pharmacy, a pharmacist preparing them carries firm liability on its back for a patient be administered to with a doctor administered to these. Analysis of the components of hospital pharmaceutical is necessary and it is assumed that it is related with improvement of the significance of a pharmacist by this to get confidence from a doctor and a patient. The ulinastatin pessary which was one of the hospital pharmaceutical requested from an obstetrician and prepared it in pharmacy, was analyzed, a main component and stability in this ulinastatin pessary. Furthermore, we did examination about the oxytocic action.

The preparation of ulinastatin pessary followed a method of "hospital pharmacy pharmaceutical". The analyses of the main component, ulinastatin, and the base stability were examined by the methods of a Japanese pharmacopoeia. We examined about (1) the conditions of the methods for extraction and separation of the main and the base component, (2) enzyme reaction condition, (3) calibration curve making method.

We tried to separate the main component, ulinastatin and the base in the pessary using the centrifugation, but it was difficult to separate those completely. After the centrifugation, it gave the influences for enzyme reaction and the UV absorbance measurement. So we reviewed the method about reaction conditions and a calibration curve method. As a result we analyzed the sample with the method that we had lead. We found the mean content of ulinastatin in the hospital pharmaceutical was keeping containing volume for setting. And the stability of the ulinastatin activity was also holding and hardly changed.

In addition, we investigated it about an ulinastatin pessary use patient and did examination about the uterine contractions inhibitory effect. Now an imminent absorption is controlled by ritodrine hydrochloride mainly, but, as for this, a side effect is easy to appear. Ulinastatin has almost no side effect. After using ritodrine hydrochloride for imminent absorption at early stage hospitalization, ulinastatin pessary can effect to control imminent absorption and reduce ritodrine hydrochloride.

Cases of Therapeutic Medicinal Ingredients as Adulterants in Dietary Supplements

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Dietary supplements advertising weight reduction or roborant nutrition have gained popularity in Japan in recent years. The presence of therapeutic medicinal ingredients often added to supplements as part of the intended use has been reported. Prolonged or excessive consumption of these supplements containing undeclared amounts of drugs may cause serious adverse health consequences.

In July 2002, "A kind of dietary supplement imported from China to Japan, claimed to reduce weight, caused serious liver dysfunction" was announced officially. Chinese-made slimming pills contained a variant of fenfluramine, an appetite suppressant that has been banned in the U.S. since 1997 for damaging heart valves. The newer compound, called N-nitroso-fenfluramine is suspected of causing life-threatening liver damage. Simultaneously, thyroid hormones, prescribed for hypothyroidism, were detected in many slimming pills. In second case, phentolamine and sildenafil were simultaneously detected in an adulterated soft drink. Intravenous administration of phentolamine mesylate, an α -adrenergic antagonist, has long been used as a treatment for hypertensive emergencies and pheochromocytoma. However, recent studies suggest that oral phentolamine is useful in the treatment of erectile dysfunction. Sildenafil citrate is the first effective oral treatment for erectile dysfunction of various etiologies. Its use is absolutely contraindicated with patients receiving nitrate therapy because of the potential for significant hypotensive effects. This is the first reported case of phentolamine and sildenafil as adulterants in a dietary supplement.

Pharmaceuticals must undergo extensive science-based efficacy and safety testing prior to public availability. Since dietary supplements are considered nutritional foods and not drugs, such testing is often avoided. Furthermore, the public sense that such therapy is naturally benign is frequently leads to overuse and cause especially a lot of clinical trouble.

Poster Presentation - 09

**Cooperation among Community Pharmacists, Hospital Pharmacists,
and Researchers on Pressure Ulcers Care**

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We community pharmacists have established this society¹ since 1997 in order to furnish drug information about pressure ulcers care. Moisture atmosphere is required for the healing of pressure ulcers. The moisture environment could be regulated depending on the physicochemical property of ointment bases. So, ointment should be reasonably chosen to adjust the moisture. We have been committed to providing pharmacists working on home care with a booklet to instruct how to choose ointments for pressure ulcers treatment since 2000. A pharmaceutical association held the training conference using the booklet as a teaching material in 2002, when hospital pharmacists cooperated in a trip to observe pressure ulcers treatment at the hospital. Nowadays researchers of pharmaceutical college also have cooperated in studying for the efficacy and economical effect of the method for blending different ointments to improve the healing process of pressure ulcers. The present poster reports the interim result of an investigation conducted to optimize the direction for use of ointments in collaboration with hospital pharmacists and researchers.

Poster Presentation - 10

**Effects of growth hormone (GH) on the mRNA levels of uncoupling
proteins 1, 2, and 3 in obese mice**

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We investigated whether GH treatment influenced the expression of UCP1, 2 and 3 mRNA in a KK-A^y obese mouse model. KK-A^y mice (n=10) and C57Bl/6J control mice (n=10) were injected subcutaneously with GH (1.0 mg/kg/day and 3.5 mg/kg/day) for 10 days, and compared with mice injected with physical saline. The KK-A^y obese mice weighed significantly less (p<0.01: 1.0 mg/kg/day, p<0.05: 3.5 mg/kg/day) and had smaller inguinal subcutaneous and perimetric white adipose tissue (WAT) pads (p<0.05: 3.5 mg/kg/day), but increased skeletal

muscle weight ($p < 0.05$). The brown adipose tissue (BAT) weight did not change significantly. Not only plasma free fatty acid and glucose levels but also plasma insulin level decreased. The reduced HOMA-IR (homeostasis model assessment-insulin resistance) values suggested that insulin resistance was improved by the GH treatment. The level of UCP1 mRNA, in the 3.5 mg GH treatment increased, 2.8-fold ($p < 0.01$ vs. control) and 2.0-fold ($p < 0.05$ vs. 1 mg GH treatment) not only in BAT, and but also 6.0-fold in the subcutaneous WAT ($p < 0.05$ vs. control). The level of UCP2 mRNA increased 2.2-fold ($p < 0.05$ vs. control) and 2.1-fold ($p < 0.05$ vs. 1 mg GH treatment) in the BAT, and 2.0 fold ($p < 0.05$ vs. control) in the skeletal muscle. One mg GH administration also stimulated UCP1 mRNA expression by 2.5-fold ($p < 0.05$ vs. control) and UCP3 mRNA expression by 2.8-fold ($p < 0.05$ vs. control) in the muscle. Lean mice had no significant difference in body composition, plasma parameters and the expression of UCP1, 2 and 3 mRNA after treatment with GH.

It was concluded that the GH treatment increased the mRNA levels of not only UCP1, but also UCP 2 and 3 in BAT, WAT and muscle in a KK- A^y obese mouse model. These findings suggest that GH-induced thermogenesis may contribute to the reduction of WAT and energy expenditure.

Poster Presentation - 11

Evaluation of Clinical Communication of Pharmacy Graduate Students at Meijo University and Effect of OSCE on Education

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Purpose: Pharmacy graduate students learn the communication skills for Clinical Clerkship at medical site. We carried out OSCE to evaluate their skills and attitudes after the lecture of clinical communication skills. This report shows the results of OSCE carried out first in Pharmacy education in Japan. The students who took an examination, the evaluator and the visitors participated in OSCE, were asked by the questionnaire. The student's attitudes and skills performed were evaluated by OSCE, and also the OSCE itself was evaluated from the result of that questionnaire.

Method: Subjects comprised 8 first year Masters' course students in Clinical Pharmacy in 2003. In the OSCE, four kinds of typical scenes that pharmacists were required in clinical site were prepared; (1) Medical Interview, (2) washing hands for the disinfection technique, (3) explaining expiratory flow meter, (4) explaining how to apply an eye drop. From examinees, evaluators, and visitors, we collected opinions about the educational efficacy of the stations where students acted in the OSCE.

Results & Discussion: There were many opinions that students could understand the important point of the communication with the patient by performing before evaluators. It was possible to improve of student's self-learning motivation again. By the opinion of the evaluator or the visitor, it was confirmed that OSCE was necessary for the communication education. On this time, we just had small scale of OSCE, however, for the large scale of OSCE execution, it was suggested that securing of staff's, evaluators and well-trained standard patients were important, with needs of appropriate rooms.

Poster Presentation - 12

**Evaluation of Drug Counseling Training using VTR at a Hospital
Pharmacy
– Case Based Learning and Role-Play Practice –**

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Purpose: At the Division of Pharmacy, Ehime University Hospital, we conduct a practical hospital training course (three or four weeks) for undergraduate students. In this practical hospital training course, students receive 2~3 sessions of drug counseling training aimed at acquiring communication skills as well as clinical knowledge. This program is the basis of case-based leaning (CBL) procedures and role-play practice using VTR. We herein describe the drug counseling training program and report the results of student evaluations.

Methods: The training program consists of the following; 1: Explanation of how the practical training will proceed, 2: Choice of a example case document including a patient profile, a diagnosis, a clinical history, laboratory data and prescription, 3: Explanation of how to collect drug information, 4: Study of individual cases by the students, 5: Recording role-play in providing drug counseling on video (the role of a patient is a clinical pharmacist), 6: Discussion and review by students and clinical pharmacists (including the person who played the patient role) after watching the VTR. After the training, we conducted a questionnaire survey of the participating students regarding this training program for drug counseling.

Results and Discussion: All students considered the practical training to be useful for them, because they could objectively evaluate the drug counseling they provided and their communication skills. In addition, they also reported that the indications and advice by the clinical pharmacists is "useful". Consequently, it is suggested that the students are satisfied with practical training in drug counseling using case-based leaning and VTR.

Patient compliance instruction for cerebral infarction patients at neurology ward in Hospital

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Now expectation for patient compliance instructions of hospital pharmacist rises, and it is important to get a feeling of confidence from a patient as a member of medical staff. In a patient ward of a hospital, a pharmacist collects informations of patients, and it is necessary to raise therapy effect including mental care. We report the result that examined a patient compliance instructions for a cerebral infarction patient.

We visited a patient in order to take a state of a patient at neurology ward of Nagoya Municipal Higashi Hospital every day and checked adverse drug reactions and others from a patient and laboratory test values. and answered the questions and anxieties for a treatment of a patient.

[Case 1] O.H., 56 years old, a man : Because the left half of the body shows numbness, and numbness was not relieved even if it is the next day, he was diagnosed as lacunar infarction and admitted in the hospital at 20.10.2003. He was administered Glyceol and Novastan, Radicut for one week and then took Bufferin, Cerocral, and Pletaal, a symptom of numbness was relaxed.

[Case 2] K.T. 64 years old, a man : He was admitted to for hypertension and diagnosed as athero-thrombotic cerebral infarction by MRI, CT. at 10.10.2003. He was administered Glyceol, Xanbon for two weeks, and then took Pletaal. But for continuing a hypertension , he was took Norvasc, and then Blopress together, and blood pressure was stable. However, an infarct lesion was big, and the numbness was left for hypertensive persistence.

Cerebral infarction is classified in (1) lacunar infarct, (2) athero-thrombotic cerebral infarction, (3) cardiogenic cerebral infarction depending on the onset. As treatment for the cerebral infarction, control of blood pressure are important in addition to blood flow improvement with continuous IVH at early stage. And rehabilitation is also important.

Because a pharmacist participates in team of medical care, compliance of a patient gets better, and Pharmacists was able to contribute to a treatment.

**PBL Education for Undergraduate Students in Okayama University,
Faculty of Pharmaceutical Science**

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In Japan, the clinical pharmaceutical education is still not fully developed and lecture-based learning is taken in pharmacy school. In Faculty of Pharmaceutical Science of Okayama University, clinical pharmaceutical education for undergraduate students has also been performed with the lecture-centered class. However, it is unlikely that this system functions students to acquire the skills of pharmaceutical care with respect to patients.

To improve the clinical pharmaceutical education and learn problem solving skills on patients, we introduced the problem-based learning (PBL) with role-playing on the 3rd year undergraduate students from 2000. In the PBL, our university hospital pharmacists and pharmacy school teaching staffs participated to not only planning and making the case scenarios, but also acting as a facilitator and in role-playing.

We constructed a curriculum for PBL process: Students working in small groups to solve problems on 4 cases (diabetes, hypertension, asthma and infection) and acting as a clinical pharmacist to gain information about problems from the simulated patient. The self-directed study in PBL class gained an understanding of the principles of pharmacotherapy and drew up hypothetical schemes for pharmaceutical care worked out the problems and discussed them.

A questionnaire survey showed that the students had valuable experienced PBL and evaluated PBL class highly, particularly with regard to learning the communication and problem-solving skill. These results suggest that PBL education should introduce to clinical pharmacy education in Japan and alter traditional teaching and learning pattern.

PBL Facilitates the Education of Clinical Pharmacy for Students of the Graduate School of Pharmaceutical Sciences

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It is important for students to acquire the ability of considering the most appropriate pharmaceutical services to provide high quality care for the patients. However, such clinical pharmacy education is still not fully developed in Japan. Recently, the PBL (Problem Based Learning), a training method giving the students chance of practice, has become to be adopted in Japanese pharmacy education. In the PBL, students gained an understanding of the principles of pharmacotherapy, drew up hypothetical schemes for pharmaceutical care, worked out the problems and discussed them together in small groups. In the under-graduated school education, we have already introduced the PBL with the role-playing which tended to help them learn communication skills.

In the present study, we developed PBL into the education of the graduate school of pharmaceutical sciences, with the objective of improving the students' problem solving skills and independence. Here, pharmacy school staffs and clinical hospital pharmacists participated in drawing up case scenarios and in role-playing as patients.

We also conducted a questionnaire survey of the students' impression about the PBL. They made a high and interesting evaluation of this program, with regard to the cooperation in group-discussing and the posture to deal with problems in comparison with previous data of undergraduate students.

These results indicate that the PBL is useful for students to learn the ability of considering clinical pharmacy activity as a pharmacist.

**Response for the claim concerning “Food for specified health uses”
from consumers in the manufacturing company**

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Purpose: In Japan, Ministry of Health, and Labor and Welfare has established the system of “Food with health claims” in 2001. They consist of two categories such as “Food with nutrient function claims” and “Food for specified health uses (FOSHU)”. At present, 412 products have been licensed as FOSHU until April 1, 2004. According to the increase of FOSHU consumption, possible problems have been gradually occurred. Here, the response in the manufacturing company for the claim concerning FOSHU from consumers was examined.

Methods: This study was conducted by the analysis of the data obtained from questionnaire to 100 manufacturing companies of FOSHU.

Results: Sixty-eight % of companies had special division for the claim from consumers. In many cases, telephone was used to inform and/or obtain the trouble and/or information, respectively. Especially, number of inquiry from 40–50’s women was the highest in all consumers. The inquiry regarding indigestible oligosaccharides, lactobacillus and dietary fiber to maintain a good gastrointestinal condition was mainly done in young generation, while old generation were interested in the FOSHU influencing cholesterol absorption, blood pressure and blood sugar level. The contents were inquiry for the adequate use of FOSHU, interaction between medical drugs and FOSHU. Interestingly, in 61% of companies, the claim was substantially discussed in the office meeting. Indeed, 23% of companies have improved the problem in some points.

Conclusions: Response of company for claim concerning FOSHU were performed in some parts. However, further continual efforts were strongly needed to avoid the health damage of consumers.

Student-centered Active-learning in Large Class Size

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Problem-Based Learning (PBL) is intrinsically said to be motivating for students to encourage them in self-directed learning. However there are various factors that affect PBL, when a teacher aims to apply the regular PBL in a curriculum. Among such factors, one concerned is the size of student population. School of pharmacy usually consists of over one hundred students in class. When one challenges to PBL, not disturbing the present curriculum, PBL should be carried out with over such many students in a large lecture room. A large class "PBL" was reportedly relevant.

The present study represents our experience to handle over hundred students in "PBL" under such limited conditions. The freshmen were in two classes of each 120 students in an elective topics. Students sitting near-by were arbitrarily grouped in the size of 5 to 13 members. The desks and chairs were unremovable. The tutor was alone, sometimes when available, one or two senior students who had experience with PBL assisted with him. The program was carried out in two class hours (2 x 90 min). All other processes were similar to those in regular PBL. The questionnaire regarding "PBL" took place to the students.

The response by the students in two classes was summarized with their comments regarding the modified "PBL". Most students were tolerated to the new learning system, whereas some difficult comments against the large class "PBL" were also expressed by the students. However, if removable desks and chairs are furnished, "PBL" in large class can be beautifully conducted.

The Role of Pharmacist in Nutrition Support Team(NST) of Matsusaka Saiseikai General Hospital

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The management of enteral and parenteral nutrition is very important for the hospitalized patient. And it's also necessary for the staff of medical treatment team that is able to identify and indicate the importance of each method for accessing the calories, protein and others required of hospitalized patient. For that nutrition management, we, the staff of our hospital organized the NST that are constituted of doctors, nurses, pharmacists, dieticians etc. on April 2000. Then, we'll show about the present situation of the NST activities of our hospital and the role of hospital pharmacist as follows. The composition of nutrition support works are ward round, meeting, conference. The ward round is once a week in every clinical part of floor divided into four according to the usual plan. Before the round, we, the member of NST discuss about the present condition of patient, the laboratory data, the medical treatment plan by doctor in charge. On the bed side, we check every nutritive items of the patient such as a favorite food, appetite, a face look and the condition of skin. After that, the recommendation meal menu is filled in the treatment chart. The NST meeting is held once a week, on Tuesday afternoon. And there, we discuss about some problems relate with nutrition support examined in a week and study. The conference held once a month or two all staff get together in our hospital in addition to the member of NST. And there, the orientation of nutrition, the educational lecture, Q&A discussion how to manage the nutrition in own house and the diet effects.

We, the hospital pharmacist propose the prescription designs of total parenteral nutrition, peripheral parenteral nutrition and enteral nutrition. And matter of fact, we propose about the pharmaceutical care such as prescription drug, transfusion, interaction between food and drug and so on. We are responsible for patient nutrition therapy as well as drug therapy outcomes and must accept responsibility for identification the nutrition problem. We, the hospital pharmacist must work closely with the member of NST for the best outcomes.

A study of the accuracy of prescription using a computerized chemotherapy order system

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A computerized chemotherapy order system (CCOS) was developed to improve the accuracy and efficiency of prescriptions for pharmacy medication scheduling at a teaching hospital, Asan Medical Center, Seoul, Korea.

We evaluated the system by comparing prescriptions before and after the implementation of the system and by analyzing the effects of the system on dosing accuracy (only against 5-FU), prescription change, overdoses above maximum limit and medication disposal in 3 groups of non computerized program group (control group), initial CCOS group and modified CCOS group.

In terms of dosing accuracy, prescription error rate (%) was significantly decreased in CCOS groups compared with the control group. The rate of prescription changes was also significantly decreased in CCOS groups compared with the control group. However, there was no significant difference between control group and the modified CCOS group. Regarding overdoses above maximum limit, we found that there was no prescription order exceeding the dosage limit in CCOS groups in contrast to significant overdoses in control group. In terms of medication disposal, there was no significant difference between 3 study groups.

We suggest that the computerized order system for chemotherapy may be an important and useful tool for minimizing prescribing errors in the hospitals.

Analysis of Oxaliplatin and Irinotecan Combined with Fluorouracil as Second-Line Treatment in Patients with Progressive, Metastatic Colorectal Cancer after 5-FU Regimen Failure

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Background/Purpose: Colorectal cancer(CRC) accounts for 9.9% of all cancers and is increasing continuously. Primary treatment for colorectal cancer is surgical resection, but approximately one half of all patients develop metastatic disease. Thus, to try to overcome these problems, various combined treatment of chemotherapy has been attempted. The purpose of this study was to estimate the efficacy(response rate, overall survival) and safety of two therapeutic combination [irinotecan + leucovorin / 5-fluorouracil(IFL)regimen and oxaliplatin + leucovorin / 5-fluorouracil(FOLFOX)regimen] in patients with advanced, metastatic colorectal cancer after failure of first-line 5-fluorouracil-based regimen.

Patients and Method: Between January 2000 and June 2003, patients with colorectal cancer were selected and reviewed retrospectively. Of the 51 enrolled patients, 24 patients received at least 2 cycles of 5-fluorouracil combined oxaliplatin chemotherapy(FOLFOX group) and 27 patients received at least 2 cycles of 5-fluorouracil combined irinotecan chemotherapy(IFL group).

Results: In FOLFOX group, response rate was 25%(partial response), the median survival time was 2.1 years and the median progression-free survival(PFS) time was 6.6 months. In IFL group, response rate was 18.5%(partial response), the median survival time was 2.0 years and the median progression-free survival(PFS) time was 12.3 months. Greater than grade 3 hematologic toxicities were 3.3% in FOLFOX group and 8.0% in IFL group of treatment cycles. The most common non-hematologic toxicity was nausea/vomiting. Grade 3 or 4 nausea/vomiting occurred in 3.0%(FOLFOX group) and 10%(IFLgroup) of treatment cycles, respectively. Grade 3 or 4 diarrhea occurred in 1% and 3% of treatment cycles, respectively. Grade 3 or 4 renal and liver toxicities were not occurred in both group.

Conclusions: IFL group had significantly longer progression-free survival(PFS) time compared to FOLFOX group. However, response, survival time and toxicities were not significantly different. Further well-designed prospective studies are required for treatment of advanced, metastatic colorectal cancer.

Appropriateness of drug usage through the computerized drug utilization review system in Korea

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Background: Adverse drug reactions caused by inappropriate drug usage affect patient's medical outcomes and can lead to social and economical losses. It has been shown that structured, continuous and systematic drug utilization review programs can promote appropriateness of drug usage. The purpose of this study was to evaluate the appropriateness of drug utilization in Korea using national prescription drug claims data to identify problems such as dosage range, duration and drug interactions.

Method: The data were derived from national prescription drug claims data that was submitted to Korean Health Insurance Review Agency by pharmacies located in the city of Seoul and Kyung-Ki province from September 1st to 15th, 2004. Appropriateness of drug usage including 3 criteria of drug dosage range (overdose and underdose), duration of therapy and drug interaction were evaluated using a commercially available computerized drug utilization review system in Korea.

Results: A total of 31,994,260 drugs were prescribed from 7,866,409 prescriptions, indicating that 4.07 drug items were prescribed per prescription. Out of 31,994,260 drugs prescribed 3,325,760 drug items (10.4%) were inappropriately prescribed in dosage, duration or had potential drug interactions. Out of 3,325,760 inappropriate prescriptions 12.05%, 10.33% and 3.41% conflicts were due to inappropriate adult, pediatric and geriatric dosage, respectively. 8.05%, 7% and 1.63% of the conflicts were due to drug interactions, contraindication of use, and duration of therapy, respectively.

Conclusion: The findings from this study indicate that inappropriate drug usage is very common and there is a great need for attention to appropriate prescribing and supportive interventions in Korea.

Keyword - DUR, inappropriate drug use, outpatient, Korea, Drug-drug interaction

Assessment of Metformin Use in Korean Type 2 Diabetes Mellitus Patients

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Purpose: The purpose of this study was to perform the very first retrospective evaluation of metformin's utilization, efficacy and the safety in Korean type 2 DM patients.

Methods: The study, first, evaluated the pattern of metformin use in accordance with published contraindications or precautions of metformin. Second, the efficacy of metformin was compared among the three groups of patients taking metformin as metformin alone (M), metformin+sulfonylurea (M+S), or metformin+insulin (M+I).

Results: Thirty-five (26.3%) and 34 (25.6%) patients out of 133 patients were treated with metformin despite the presence of contraindicated and precautionary risk factors, respectively. The percentage of patients who maintained within target range of HbA1c, FBG, and Pp2hr were 34%, 32%, and 9%, respectively. The level of HbA1c in M, M+S, and M+I groups decreased significantly after 12 month of treatment ($p=0.043$, <0.0001 , 0.021 , respectively). The changes in FBG levels after 12 months of treatment in three groups were variable ($p=0.028$, 0.002 , 0.081 , respectively). The change in Pp2hr level was significant only in M+I group ($p=0.003$). The changes in total cholesterol and triglyceride level among the groups were variable. HDL-C increased significantly from baseline in metformin alone group ($p=0.020$) while the decrease in LDL-C was insignificant in all three groups. The mean dose of insulin in M+I group was 12.5% lower at 12 month of therapy. Most reported adverse drug reactions were mild and GI related.

Conclusion: High percentage of patients with the risk of MALA continued treatment with metformin. Metformin had positive effects on lowering blood glucose and lipid levels with mild adverse drug reactions.

Keywords – Metformin, drug use evaluation, efficacy, safety

Characteristics of current IV admixture system and expected benefits of pharmacy based centralized IV admixture system

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Purpose: The purpose of this study was to characterize and describe the advantages and disadvantages of the current intravenous (IV) admixture system in the Seoul National University Bundang Hospital (SNUBH). In addition, the anticipated concerns and requirements for the development and implementation of the centralized pharmacy based admixture system were investigated.

Methods: To investigate the current status and the trend of IV admixture preparation by the pharmacy department, the total number and the type of IV admixtures prepared by the pharmacy department since the opening of the hospital was determined. The differences of current IV admixture procedure between the nursing and pharmacy department were compared. Nurses and pharmacists in SNUBH were surveyed to obtain their opinion on current IV admixture system and the expectation of pharmacy based centralized admixture system.

Results: Only TPN and chemotherapeutic agents were admixed from the pharmacy department and the number of TPN and chemotherapeutic admixtures prepared by the pharmacy department from May 2003 to April 2004 increased continuously from 48 to 1977. Sixty-eight percent of the surveyed nurses responded that they spend less than 1 hour for the preparation of IV admixture. Nurses indicated that the current IV admixture performed by the nurses in ward were problematic in lack of information for physicochemical characteristics (31.3%), possibility of contamination due to open environment of ward (23.9%), and possible dose miscalculation (18.3%). The expected benefits by implementation of the centralized pharmacy-based admixture program were a possible decrease in microbial contamination, ease availability of information, standardization of policy and procedures for IV admixture, prevention of medication errors with detailed content of labeling, and the saving in IV admixture preparation time. The things the nurses were most concerned with the implementation of centralized pharmacy-based admixture program were delivery of prepared IV to ward on time, and availability of admixture service over 24 hours. Pharmacists were most concerned with sufficient personnel staffing for IV admixture of all injectable drugs by pharmacy department.

Conclusions: This study found that the nurses and pharmacists expect that implementation of the centralized, pharmacy-based admixture program can reduce many current problems associated with IV admixture prepared by the nurses in the ward.

Comparative bioavailability of ketorolac after transdermal and oral administration to rats

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Objectives: To determine bioavailability and pharmacokinetics for transdermal and oral administration of ketorolac tromethamine to rats.

Method: Male Sprague-Dawley rats weighing 280-320 g were divided into three groups, comprising 6 rats each. Ketorolac tromethamine was administered by oral (2487 $\mu\text{g}/\text{kg}$), transdermal delivery system (TDS) 1 (2101 $\mu\text{g}/\text{kg}$) and TDS 2 (2392 $\mu\text{g}/\text{kg}$) administration. Diethylene glycol monoethyl ether (DGME)-propylene glycol monolaurate (PGML) and DGME-propylene glycol monocaprylate (PGMC) at the ratio of 4 : 6 were employed as a penetration enhancer for TDS 1 and TDS 2, respectively. Serum samples (0.1 ml) were collected from the femoral artery cannula before and 0.25, 0.5, 1, 2, 4, 6, 8, 12, and 24 hr after drug administration and analyzed by HPLC.

Results: Lower C_{max} and prolonged T_{max} of ketorolac were observed with transdermal administration; C_{max} and T_{max} by oral, TDS 1 and TDS 2 administration were 4182.6 ± 639.8 ng/ml and 0.25 ± 0.05 , 2524.9 ± 1262.4 ng/ml and 2.0 ± 1.0 hr and 1733.7 ± 646.8 ng/ml and 3.3 ± 0.6 hr, respectively. The AUC values obtained by TDS 1 (14721 ± 7360.8 ng · hr/ml) and TDS 2 (14797 ± 4613.2 ng · hr/ml) were comparable with oral administration (15704 ± 4653.2 ng · hr/ml) whereas half-life by TDS administration increased from 3.6 to 6.7 hr, compared to oral administration.

Conclusions: Ketorolac TDS using DGME-PGMC or DGME-PGML at the ratio of 4 : 6 as a penetration enhancer showed comparable AUC, prolonged half-life and T_{max} and decreased C_{max} compared to oral delivery.

Cost-Effectiveness Analysis of Amifostine in Combination with Paclitaxel or Cisplatin in Korean Gynecologic Cancer Patients

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Purpose: To perform the cost-effectiveness analysis (CEA) of amifostine given in combination with paclitaxel or cisplatin in Korean gynecologic cancer patients.

Methods: Forty-one patients with gynecological cancer receiving cisplatin (T) 75mg/m² or paclitaxel (P) 135~175mg/m² with or without amifostine (A) (910mg/m²) every 3 weeks for six cycles were evaluated. The 'effectiveness' (E) of amifostine was determined by evaluating the frequency and the severity of hematologic, neurologic, and renal toxicities. The 'cost' (C) of the treatment was determined by including the expenses from the drugs, laboratory tests, and any other additional medical expenses for treating the chemotherapy-induced adverse effects. C/E ratio, incremental cost-effectiveness ratio (ICER), and ICER graph were evaluated. ICER was determined as the ratio of the difference in costs between two groups to the difference in frequency of toxicities between the same two groups.

Results: The cost per frequency of episode or C/E ratio for toxicity-grade 3, 4 neutropenia was ₩20,329/percent, ₩18,454/percent, ₩16,840/percent, ₩5,058/percent, and ₩5,058/percent in TAP, TP, cyclicTAP, and cyclicTP group, respectively. C/E ratio of neuropathy was ₩8,600/percent, ₩1,905/percent, ₩11,032/percent, and ₩726/percent in TAP, TP, cyclicTAP, and cyclicTP group, respectively. ICER of neutropenia and neuropathy between TAP and TP was 547,730/22.06 and 512,611/-9.07, respectively. ICER of neutropenia and neuropathy between cTAP and cTP was 466,275/-0.16 and 497,061/4.49, respectively. ICER graph indicated that the groups treated with amifostine were inferior to control groups. All ICER except ICER of neuropathy between cTAP and cTP was located in IV area, which meant that pre-treatment of amifostine was less effective and more costly than no amifostine.

Conclusion: The cost for chemotherapy-induced toxicity was more expensive in the groups treated with amifostine. Pre-treatment of amifostine was inferior to that of control groups in pharmacoeconomic analysis.

Development of drug information service for the consumer's right to know

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After new prescription law separating prescribing and dispensing functions between pharmacists and physicians in drug use process, the needs for knowing drug information by consumers are ever increasing. Though many online portal sites providing health information are available in Korea, there is no online site which is providing comprehensive health and drug information based on evidence-based resources for the public.

An online portal system was designed for satisfying consumer's right to know and transferring prescription information electronically to community pharmacies on consumer's preference.

The digital contents for satisfying consumer's right to know consist of multimedia education information for disease and how to use the medication of special form, patient's education monographs which give a full detail of the information and general information for all drugs in Korea.

The online system for transferring prescription information to community pharmacies by patients was developed using commonly used electronic mailing system with specially designed document format. Through this system, the patients may communicate with community pharmacies instantly at their own convenience to get their prescriptions filled along with more efficient medication teachings by the pharmacists.

This system is expected to be one of the best online models for the public to acquire health and drug information on their own demands.

Development of Korean National Drug Code System

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Since the numbers of drugs are ever increasing, drug information management in the computerized practice environments is becoming essential in every processes of drug production, delivery and consumption. After new prescription law separating prescribing and dispensing in drug use process, the needs for drug information and efficient management are greatly expanding and information technology is also so advancing in most healthcare industries and government. However, most IT companies and governmental agencies for drug administration are experiencing troublesome difficulties in managing drug information due to the absence of national drug code system.

In this study, we named the new code system as KNDC(Korean National Drug Code) which would be essential for efficient drug administration nationwide, and also tried to develop the proposal for the model of KNDC by investigating current status and trends of domestic and abroad drug code systems. The proposed model of KNDC was also reviewed by the representatives from government, pharmaceutical industries, healthcare institutions and IT companies.

As the result, 2 KNDC models such as KNDC system adopting EAN System and ATC system and KNDC system with new identification code system combined with ATC system were proposed. Also, the strategic plan for creating, implementing and maintaining new KNDC system were proposed.

Drug interaction between tamoxifen and naringin

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Purpose: The aim of this study was to investigate the effect of naringin on the bioavailability of tamoxifen after oral administration of tamoxifen with naringin to rats.

Methods: Tamoxifen (10 mg/kg) was administered orally to rats coadministered or pretreated (0.5 h and 3 days) with naringin (1, 7.5 and 15 mg/kg) in rats.

Results: The plasma concentrations of tamoxifen with naringin were increased significantly ($p < 0.05$, at coadmin., $p < 0.01$, at pretreat.) compared to the control. The areas under the plasma concentration-time curve (AUC) and the peak concentrations (C_{max}) of tamoxifen pretreated with naringin were significantly higher ($p < 0.05$, at coadmin., $p < 0.01$, at pretreat.) than the control. The half-life ($t_{1/2}$) of tamoxifen with naringin was significantly ($p < 0.05$) longer than the control. The absolute bioavailability (AB%) of tamoxifen with naringin was significantly higher ($p < 0.05$, at coadmin., $p < 0.01$, at pretreat.) than the control. Absorption rate constant (K_a) of tamoxifen with naringin were increased, but not significant. The relative bioavailability (RB%) of tamoxifen with naringin was 1.35- to 1.99- fold higher than the control. The C_{max} and AUC of 4-hydroxytamoxifen with naringin were lower than the control. The metabolite-parent AUC ratio in the rats pretreated with quercetin was decreased significantly ($p < 0.05$, at naringin 7.5 and 15 mg/ml).

Conclusions: These results suggest that naringin enhanced bioavailability of tamoxifen by inhibition of CYP 3A4 in the liver and intestinal mucosa, and the P-glycoprotein efflux pump mainly in the intestinal mucosa. The tamoxifen dose should be adjusted when it is administered with naringin over a long period.

Effect of quercetin on the pharmacokinetics of verapamil and norverapamil

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Purpose: The aim of this study was to investigate how quercetin affects the bioavailability and pharmacokinetics of verapamil and its major metabolite, norverapamil.

Method: Pharmacokinetic parameters were calculated after the oral administration of verapamil (10 mg/kg) to rabbits that were coadministered or pretreated with quercetin (1.5, 7.5 and 15 mg/kg).

Results: The plasma verapamil concentrations in the rabbits pretreated with quercetin were significantly higher ($p < 0.01$ and $p < 0.05$) than the control. However, the plasma verapamil concentrations in the rabbits coadministered with quercetin were not significant. The peak concentrations (C_{max}) and the areas under the plasma concentration-time curve (AUC) of verapamil in the rabbits pretreated with quercetin were significantly ($p < 0.01$ and $p < 0.05$, respectively) higher than the control. The absolute bioavailability ($F_{A,B}$) and the relative bioavailability ($F_{R,B}$) of verapamil in the rabbits pretreated with quercetin were significantly higher (14.4-21.9% and 159-242%, respectively) than the control (9.1% and 100%, respectively). The C_{max} , AUC and $F_{A,B}$ of the verapamil in the rabbits coadministered with quercetin were higher, but this was not significant. The C_{max} and AUC of norverapamil in the rabbits with quercetin were lower than the control. The metabolite-parent AUC ratio in the rabbits pretreated with quercetin was decreased significantly ($p < 0.05$, at quercetin 7.5 and 15 mg/ml), while elimination half-lives of verapamil was unaffected.

Conclusions: These results suggest that quercetin alters the disposition of verapamil by inhibiting the P-glycoprotein efflux pump and CYP 3A4, mainly in the intestinal mucosa. The verapamil dose should be adjusted when it is administered with quercetin over a long period.

Effects of calcium channel blockers on the pharmacokinetics of nateglinide in rabbits

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Objectives: To investigate the effects of diltiazem, verapamil and nifedipine on the pharmacokinetics of nateglinide, a new oral hypoglycemic agent.

Method: Male New Zealand White rabbits weighing 2.0-2.5 kg were divided into four groups, comprising 6 rabbits each. Group 1-4 were administered with nateglinide only, nateglinide and diltiazem, nateglinide and verapamil, and nateglinide and nifedipine, respectively. A dose of 30 mg/kg of nateglinide was administered orally to each of the animals 30 min after the administration of diltiazem (10 mg/kg), verapamil (20 mg/kg) or nifedipine (5 mg/kg). Serum samples (0.15 ml) were collected from the femoral artery cannula before and 0.25, 0.5, 0.75, 1, 1.25, 1.5, 2, 2.5, 3, 4, 6 and 8 hr after drug administration and analyzed by HPLC.

Results: With co-administration with nifedipine, $AUC_{0-\infty}$ and AUC_{0-8} were 201.8% ($P < 0.05$) and 180.7% ($P < 0.05$) of the respective control value. The C_{max} and half-life of nateglinide increased from 21.7 to 39.4 $\mu\text{g/ml}$ ($P < 0.01$) and 3.1 to 7.1 hr ($P < 0.05$) by nifedipine, respectively. Diltiazem also increased C_{max} and AUC_{0-8} of nateglinide from 21.7 to 39.0 $\mu\text{g/ml}$ ($P < 0.05$) and 68.7 to 91.8 $\mu\text{g} \cdot \text{hr/ml}$ ($P < 0.05$), respectively. However, verapamil did not affect the pharmacokinetics of nateglinide except for shortening the T_{max} from 0.92 to 0.58 hr. ($P < 0.05$).

Conclusions: Nifedipine and diltiazem significantly increased AUC_{0-8} and C_{max} of nateglinide. Concomitant use of nifedipine or diltiazem with nateglinide may increase the risk of hypoglycemia possibly due to the inhibition of the cytochrome P450 3A4-mediated biotransformation of nateglinide.

Effects of Drug Interaction with Clopidogrel on Cardiovascular Disease and Side Effects

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Background/Purpose: Clopidogrel is used to reduce the risk of cardiovascular events in patients with atherosclerosis documented by recent ischemic stroke, recent myocardial infarction (MI), or established peripheral arterial disease (secondary prevention). Clopidogrel is metabolized by CYP3A4, and the active metabolites inhibit platelet aggregation. The purpose of this study was to investigate the relative efficacy and safety of clopidogrel only versus clopidogrel + others (aspirin, CYP3A4 inhibitor, and CYP3A4 inducer).

Patients and Method: We reviewed the charts of patients who visited between August 1, 2002 and August 31, 2003, retrospectively. Total 72 patients were included and they consisted of 5 groups; clopidogrel group (n=36), clopidogrel + aspirin group (n=11), clopidogrel + CYP3A4 inhibitor group (n=15), clopidogrel + aspirin + CYP3A4 inhibitor group (n=6), clopidogrel + CYP3A4 inducer group (n=4).

Results: The primary endpoints at 6 months, 12 months were the composite of cardiovascular (CV) events. The secondary endpoint was the incidence of bleeding events at 6months, and 12months. At 12months, the primary endpoint was not significantly different among the five groups (p=0.056). In comparison of two groups as clopidogrel only versus clopidogrel + others (aspirin, CYP3A4 inhibitor, and CYP3A4 inducer), the primary endpoint was significantly different (p=0.02). The CV events were increased in the clopidogrel + others group. The secondary end point was not significantly different among the five groups (p=0.52). However, time to bleeding events was 230.8 in the clopidogrel group and 74.7 in the clopidogrel + others group (p = 0.046).

Conclusions: Clopidogrel interaction with aspirin, CYP3A4 inhibitor, and CYP3A4 inducer affected cardiovascular events and bleeding events. Drug interaction of clopidogrel with concurrent medications should be considered cautiously.

Effects of lipid lowering agents on the pharmacokinetics of nateglinide in rabbits

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Objectives: To investigate the effects of gemfibrozil, lovastatin and fluvastatin on the pharmacokinetics of nateglinide, a new oral hypoglycemic agent.

Method: Male New Zealand White rabbits weighing 2-2.5 kg were divided into four groups, comprising 6 rabbits each. Group 1-4 were administered with nateglinide only, nateglinide and gemfibrozil, nateglinide and lovastatin, and nateglinide and fluvastatin, respectively. A dose of 30 mg/kg of nateglinide was administered orally to each of the animals 30 min after the administration of gemfibrozil (150 mg/kg), lovastatin (3 mg/kg) or fluvastatin (3 mg/kg). Serum samples (0.15 ml) were collected from the artery cannula before and 0.25, 0.5, 0.75, 1, 1.25, 1.5, 2, 2.5, 3, 4, 6 and 8 hr after drug administration and analyzed by HPLC.

Results: Among lipid-lowering agents co-administered with nateglinide, gemfibrozil affects pharmacokinetics of nateglinide. The $AUC_{0-\infty}$, AUC_{0-8} and C_{max} of nateglinide decreased from 96.2 to 43.1 $\mu\text{g} \cdot \text{hr/ml}$ ($P < 0.05$), 68.7 to 30.8 $\mu\text{g} \cdot \text{hr/ml}$ ($P < 0.005$) and 21.7 to 10.3 $\mu\text{g/ml}$ ($P < 0.0001$), respectively. Compared to nateglinide alone, significantly increased V_z (terminal phase)/F/kg (1.9 vs. 4.5 L, $P < 0.005$) and $Cl/F/kg$ (0.37 vs. 0.92 L/hr, $P < 0.05$) were observed by the addition of gemfibrozil without changing elimination half-life.

Conclusions: Gemfibrozil significantly decreased AUC and C_{max} of nateglinide whereas it increased $V_z/F/kg$ and $Cl/F/kg$. This was probably caused by alteration of protein binding of nateglinide by gemfibrozil. Concomitant use of gemfibrozil with nateglinide may reduce the blood glucose-lowering effect of nateglinide.

Efficacy and Safety of Cyclosporine Therapy in Children with Nephrotic Syndrome

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Although most children with idiopathic nephrotic syndrome respond to corticosteroid therapy, many responders show steroid dependency and frequent relapse. In these children, one of the major problems is the serious side effects resulting from continuous steroid therapy. Thus, this study was conducted to assess the therapeutic efficacy and safety of six-month cyclosporine treatment with the low-dose deflazacort therapy in children with nephrotic syndrome. Thirty children with steroid dependence (SD), frequent relapse (FR) and steroid resistance (SR) were enrolled in this study. They were treated with 6-month oral cyclosporine (Cypol-N[®]) plus the low-dose deflazacort (Calcort[®]) therapy at Samsung Medical Center from September 2002. The dosage of cyclosporine was started at 5 mg/kg/day and was monthly adjusted to maintain clinical remission and/or a trough blood level, while deflazacort dosage was reduced gradually. Clinical evaluation and monitoring of cyclosporine toxicity were performed every 2~4 weeks. Outcomes were compared to the latest six-month period of steroid only therapy before cyclosporine treatment. Student's *t*-test and ANOVA were used for statistical analysis. Out of 28 children with SD and FR, 23 (82.1%) sustained remission, and 5 (17.9%) experienced 1 or 2 relapses during therapy. Out of 2 children with SR, 1 child sustained remission, and 1 child showed no response. The mean duration of remission and occurrence of relapse were significantly improved ($p < .0001$). In addition, the mean dosage of steroid was significantly reduced ($p = .003$). Although a number of adverse effects occurred in this study, they were not so serious as to necessitate discontinuation of the therapy. No nephrotoxicity was observed. Twenty out of the 28 children who had been in remission relapsed after withdrawal of cyclosporine. Fifteen of these children showed relapse within a month. These results demonstrated that the combination of cyclosporine with the low-dose deflazacort was efficient and safe in children with SD and FR during the six-month treatment. However, further studies are necessary in order to resolve the problem of high relapse rate after discontinuation of cyclosporine.

Key words - Cyclosporine, Nephrotic syndrome, Steroid dependency, Steroid side effects, Deflazacort

Outcome Evaluation by Treatment Protocols of Acute Paraquat Poisoning

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Background and Objective: Paraquat(1,1'-dimethyl 4,4'-bipyridium dichloride) is widely used as a potent herbicide which is associated with high mortality. Objectives of this study are to evaluate clinical outcomes how antioxidants with conventional protocol have influence on the mortality of paraquat poisoning.

Design: This retrospective study included a total of 157 patients with acute paraquat intoxication. They were treated with one of three protocols: conventional protocol(group I), conventional protocol with deferoxamine(Group II), conventional protocol with deferoxamine and N-acetyk-L-cystein(Group III).

Setting: Sooncheonhyang Hospital, Poisoning Treatment Center in Rural Area.

Main Outcome Measures: Data were collected for demographics, cause of paraquat exposure, route of paraquat exposure, time intervals between intoxication and first medical treatment, time intervals between intoxication and hopital admission. Outcomes after acute paraquat poisoning were determined as survival and death.

Results: Mean age of paraquat intoxication patients was 42.3±15.6 years old. Mean amount of paraquat exposure was 36.5±36.2mL. Time to the first medical treatment averaged 6.9±18.5 hours, and time to SCH averaged 22.4±34.8 hours. The higher amount of paraquat exposure and the higher extent of paraquat detected in urine led to the higher mortality. It was found that the more number of added antioxidants would led to the lower mortality though addition of antioxidants, deferoxamine and N-acetyl-L-cysteine, to conventional protocol did not show statistically significant difference.

Conclusions: The amount of paraquat exposure and the extent of paraquat detected in urine could predict clinical symptoms and prognosis in acute paraquat poisoning. Additional antioxidants, deferoxamine and N-acetyl-L-cysteine, to conventional protocol contributed to decreasing the mortality of paraquat poisoning, so it is positively recommended that these antioxidants should be widely used in clinical aspects.

Pattern of Medications Usage and Potentially Inappropriate Medication Usage among Korean Ambulatory Elderly Patients based on an explicit criterion

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Purpose: To determine the extent and rate of prescription drug therapy, especially polypharmacy and the prevalence of potentially inappropriate medication use in Korean elderly ambulatory patients based on an explicit criterion.

Methods: Performed a retrospective study of 65 years or older ambulatory patients visiting a university hospital based clinic from January 2002 to April 2004. Study determined the patterns of drug prescription per Anatomical Therapeutic Chemical Classification and the potentially inappropriate medication usage based on explicit Beers criteria.

Results: Of the 4042 elderly patients the mean number of prescription was 2.2 ± 2.0 , which was similar between genders and all age groups within the elderly. 10.7% of patients were prescribed with more than 5 medications concurrently. The most frequently prescribed medication was the drugs used for treating nervous system diseases (44.3%), followed by alimentary tract/metabolism disorders (27.6%), cardiovascular disease (10.7%), blood/blood forming disorders (4.3%), respiratory disorders (6.5%), and musculoskeletal diseases (3.2%). A total of 511 elderly (13%) was prescribed with medication that met the criteria for ≥ 1 potentially inappropriate drugs for the elderly. This proportion was similar between genders and all age groups within the elderly. Among these 511 elderly patients the mean number of potentially inappropriate drugs prescribed was 5.1 ± 3.3 drugs. Potentially inappropriately prescribed drugs included amitriptyline (76case), diazepam (69case), ketorolac (57case), short acting nifedipine (44case), triazolam (38case), and hydroxyzine (38case).

Conclusion: Potentially inappropriate drug prescribing in Korean ambulatory elderly patients are common. Education programs and interventions aimed at optimizing the prescribing and dispensing of the most appropriate drugs are needed.

Pharmacokinetics of Verapamil in Hepatic Disorder

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Purpose: The purpose of this study was attempted to investigate the pharmacokinetics of verapamil in rabbits with carbon tetrachloride-induced hepatic disorder.

Methods: Verapamil (10 mg/kg) orally administered to the rabbits with carbon tetrachloride (carbon tetrachloride/olive oil, 1/9, v/v)-induced hepatic disorder. Plasma concentrations of verapamil were detected with HPLC.

Result: The plasma concentrations of verapamil were increased significantly ($p < 0.05$, in slight group; $p < 0.01$, in moderate and severe group) in hepatic disorder compared to the normal group. The area under plasma concentration-time curve (AUC) and the peak concentration (C_{max}) of verapamil were significantly higher ($p < 0.05$, in slight; $p < 0.01$, in moderate and severe) in hepatic disorder than the normal. The half-life ($t_{1/2}$) and the time to reach the peak concentration (T_{max}) of verapamil in hepatic disorder were prolonged significantly ($p < 0.05$, in slight; $p < 0.01$, in moderate and severe) compared to the normal. The absolute bioavailability (AB%) of verapamil in hepatic disorder was increased significantly ($p < 0.05$, in slight; $p < 0.01$, in moderate and severe) compared to the normal. The relative bioavailability (RB%) of verapamil in hepatic disorder was 1.49 to 2.44-fold higher than normal.

Conclusion: Based on the results, it is desirable to adjust dosage regimen of verapamil, when the verapamil is administered to patients with liver disorder in clinical practice.

Key words - Pharmacokinetics, Verapamil, Bioavailability, Dosage regimen, carbon tetrachloride-induced hepatic disorder.

Stability of roxatidine acetate in parenteral nutrient solutions containing different amino acid injections

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Objectives: To evaluate the stability of roxatidine acetate when they are mixed with parenteral nutrient (PN) solutions containing different amino acid injections.

Method: Roxatidine acetate hydrochloride 75mg, which was constituted with 5 ml of 5% dextrose injection, was added to 500 ml of PN solutions (PN I: 10% Fravasol[®], PN II: Livaframine[®]), and stored at 4°C in a refrigerator or 25°C in a temperature-controlled water bath. At predetermined time, samples were assayed by stability-indicating HPLC method.

Results: The chromatographic analysis after deliberate degradation showed no evidence of any breakdown product likely to interfere with the chromatographic peak of the parent substance. The relation between roxatidine acetate hydrochloride concentration in PN solution and peak area is linear from 30 to 200 µg/ml ($y = 59299x + 35571$, $r^2 = 0.99991$). The analysis method was precise, with coefficients of variation no greater than 1.4 %. Roxatidine acetate was stable at 4 in PN I solution; only 6.4% of the initial concentration degraded for 4 weeks. When it was stored at 25 °C.

, it degraded significantly after 3 weeks (the initial roxatidine concentration remaining: $88.9 \pm 1.5\%$). In PN II, more rapid degradation was observed; the percentages of the initial roxatidine concentration remaining were 91.4 ± 0.6 and 81.8 ± 1.0 (4°C), and 64.2 ± 0.6 and 58.0 ± 0.6 (25 °C) at 3 and 4 weeks after mixing, respectively. The pH variations of all test solutions were minimal, which ranged from 6.0 to 7.0. Any precipitate was not observed during the study. However, color turned yellowish from 3 weeks after mixing in PN I.

Conclusions: The results indicated that the stability of roxatidine acetate was significantly affected by the amino acid sources and storage temperatures.

The Patterns and Appropriateness of Medication Use in Korean Elderly Inpatients

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Background: Elderly patients are particularly vulnerable and most at risk of suffering adverse drug reactions, which are often caused by inappropriate prescribing practice. Gaining insight into drug prescribing pattern in order to identify prescribing problems is the fundamental first step in trying to improve the quality of prescribing in the elderly.

Objective: The purpose of the study was to determine the extent and rate of drugs used and the prevalence of potential inappropriate medication usage based on an explicit criterion in Korean elderly inpatients.

Method: All the prescriptions issued to 65 years or older patients hospitalized in a university hospital from January to March 2004 were recorded. The study determined the patterns of drug prescription per Anatomical Therapeutic Chemical Classification and the potentially inappropriate medication usage based on explicit Beers criteria.

Results: A total of 4519 elderly inpatients [2449 (54.2%) men and 2070 (45.8%) women] were evaluated. The mean number of drugs prescribed per patient during the hospital stay was 18 ± 13.67 , which was similar between genders and all age groups within the elderly. The most frequently prescribed medication was drugs used for treating alimentary tract/metabolic disorders (90.4% of patients), followed by cardiovascular disease (63% of patients), blood/blood forming disorders (62% of patients), and central nervous system disorders (77.5% of patients). In total, 2592 elderly patients (57.3%) were prescribed with medication that met the criteria for ≥ 1 potentially inappropriate drugs for the elderly. The mean number of potentially inappropriate drug prescribed was 1.79 ± 0.2 . This proportion was similar between genders and all age groups within the elderly. The three most common potentially inappropriate drugs prescribed were bisacodyl, ketorolac, and short acting nifedipine.

Conclusion: Potentially inappropriate drug prescribing for Korean elderly patients in the hospital is common. More appropriate use of prescription drugs is a key element in improving disease management for elderly patients. Education programs and interventions aimed at optimizing the prescribing and dispensing of the most appropriate drugs are needed.

A study on the usage of drugs that affect the renal function of critically ill patients

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Alterations of renal function are constantly associated with decreased in renal blood flow, renal mass and creatinine clearance. These changes have a major impact on patient management in particular with respect to drug therapy. This retrospective study was conducted to review the usage of drugs that affect renal function, the relationship between the drugs and the creatinine clearance and the degree of dose adjustment practice in the critically ill patients. Forty-two subjects (n=42) have been enrolled in the study. Drugs that are known to cause increase in renal function will be classified as positive effect drugs whilst drugs that are known to deteriorate renal function will be classified as negative effect drugs. Creatinine clearances of the subjects were highly reduced in both affecting drugs usage. The effects of positive effect drugs on improving the renal function and the effect of negative effect drugs on further deteriorating the renal function of the ICU subjects were not significantly showed any pattern. Dosage modifications of antibiotics among renal dysfunction patients in this studied were not being performed optimally based on established references. In conclusion, the effects of drugs on the renal function were unpredictable, thus, close monitoring of renal function for critically ill patients with multiple drugs therapy is needed.

**Assessment of pharmaceutical care needs in type 2 diabetes mellitus
in relation to primary prevention of coronary heart disease**

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Coronary heart disease (CHD) is the leading cause of morbidity and mortality in people with diabetes, accounting for about 50 % of all death. Type 2 diabetes is a strong risk factor for CVD and is associated with a 2-4 fold increased risk for coronary heart compared with non-diabetics. The objective of this descriptive and retrospective study is to assess the pharmaceutical needs of type 2 diabetes in relation to primary prevention of coronary heart disease. A total number of 38 patients were randomly selected for this study which was conducted in HUKM. The study comprises of two parts; firstly to look at the adherence of prescribers to the recommended treatment guidelines and risk factors in the primary prevention of coronary heart disease in type 2 diabetes and secondly, to identify pharmaceutical care issues and determine the pharmaceutical care needs in this particular group of subjects and subsequently a pharmaceutical care plan was prepared. The results showed that the level of adherence of prescribers to the treatment guidelines is low(16 %) with 36% subjects on aspirin/antiplatelet therapy, 24% subjects on beta blockers, 34% subjects on ACE inhibitors and the highest 65% subjects on statin therapy. Out of 540 pharmaceutical care issues identified, 24% of subjects required monitoring of disease states or drugs followed by 20% of subjects had altered laboratory measurement, 12% of subjects on precaution and last but not least, noncompliance which account for 7% of the subjects. The pharmaceutical care activities identified reflected that there was a need for clinical pharmacists to be on the wards. In conclusion, a treatment guideline for this group of patients need to be prepared for the benefit of new doctors and the pharmaceutical care plan prepared can be adopted for pharmacists in the public sector.

Evaluation Of Final Year Pharmacy Students Assessment On Drug Related Problems in Surgical Ward

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Introduction: Evaluation of students' ability to identify and give recommendations on drug related problems is necessary to ensure that commonly required knowledge and skills are being taught effectively and efficiently. In addition to standard teaching evaluation method, an important element in faculty evaluation in a pharmaceutical care program will be student performance in practice.

Objective: To assess students' ability to identify drug related problems (DRPs) and give appropriate recommendations with references sources.

Methods: The study was conducted retrospectively. Data collection was based on the students' final year surgical case reports for 2003 at a Malaysian teaching hospital. Only the complete students' reports were used for the evaluation. Specific form was used for data collection. Assessments on their ability to identify DRPs and provide recommendation were based specific criteria. The data Collected was then analyzed using MS Excel & SPSS 10.0.

Results: There were ninety reports completed out of ninety-five. A total of 237 DRPs were detected with mean of 2.6 DRPs per patient. Most of the drug related problems, 234(84.2%) were categorized and 237(85.3%) identified appropriately. Interestingly, most of the recommendations given 238(71.6%) were appropriate. Majority of students (89%) used pharmacotherapy textbooks as their references.

Conclusion: Most of students were able to identify DRPs and give appropriate recommendations. Phamacotherapy textbooks were the main sources of the students' references.

Key word - Student-evaluation, pharmacy-students, Drug related-problems, recommendation and surgical clerkship

Patient-Related Pharmaceutical Care Issue

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The increase number in mortality, morbidity and hospitalization cost are well-recognized due to pharmaceutical care issues. It is important to identify the case early and intervention should be taken immediately. This cross-sectional study was conducted in the National University of Malaysia Hospital where subjects were chosen using a convenience sampling method. Interview session was conducted to identify actual and potential pharmaceutical care issues. Sixty subjects within the age range of 17 to 80 years old were selected. Most of the subject has primary level of education (46.7%), and majority subject have chronic diseases (66.7%). The most common actual adverse drug reaction documented was drug side effect (79%), which involves cardiovascular drugs. Potential adverse drug reaction was related to the reduction of the renal and liver function. 85% of the subjects have actual compliance issues. Non-compliance is expected in subjects with hearing problems and subjects who have difficulties to read and understand direction on the label. The study showed subjects' knowledge about disease and drug taken was not satisfied in 68% of subjects and 25% of the subjects were not interested to be counseled. In conclusion, the percentages of pharmaceutical care issue related to patient are high therefore it is important to have an early intervention toward the issues.

Primary prevention of coronary heart disease in type 2 Diabetes mellitus

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Coronary heart disease (CHD) is the leading cause of morbidity and mortality in people with diabetes, accounting for about 50% of all death. Type 2 diabetes is a strong risk factor for CVD and is associated with a 2-4 fold increased risk for coronary heart compared with non-diabetics. The objective of this descriptive and retrospective study is to assess the pharmaceutical needs of type 2 diabetes in relation to primary prevention of coronary heart disease. A total number of 38 patients were randomly selected for this study which was conducted in HUKM. The study comprises of two parts; firstly to look at the adherence of prescribers to the recommended treatment guidelines and risk factors in the primary prevention of coronary heart disease in type 2 diabetes and secondly, to identify pharmaceutical care issues and determine the pharmaceutical care needs in this particular group of subjects and subsequently a pharmaceutical care plan was prepared. The results showed that the level of adherence of prescribers to the treatment guidelines was low(16%) with 36% subjects on aspirin/antiplatelet therapy, 24% subjects on beta blockers, 34% subjects on ACE inhibitors and the highest 65% subjects on statin therapy. Out of 540 pharmaceutical care issues identified, 24% of subjects required monitoring of their disease states or drugs followed by 20% of subjects had altered laboratory measurement, 12% of subjects on precaution and last but not least, noncompliance which account for 7% of the subjects. The pharmaceutical care activities identified reflected that there was a need for clinical pharmacists to be stationed in the wards. In conclusion, a treatment guideline for this group of patients need to be prepared for the benefit of new doctors and the pharmaceutical care plan prepared can be adopted for pharmacists in the public sector.

Rationale use of Ranitidine as Stress Ulcer Prophylaxis in Intensive Care Unit

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Introduction: Critically ill patients have higher tendency to develop stress ulcer and stress ulcer prophylaxis is highly recommended for this group of patients. Ranitidine was identified as the agent of choice for prevention of stress ulcer. American society Hospital Pharmacy (ASHP) developed therapeutic guidelines on stress ulcer prophylaxis. Risk factors for stress ulcer formation, which based on clinical trials papers and many other studies recommendation.

Objective: The main objective of this study is to evaluate the rational use of ranitidine as stress ulcer prophylaxis in general ICU (GICU), Penang General Hospital.

Method: The study was carried out prospectively with convenient sample. All GICU patient receiving ranitidine were involved. Patient received ranitidine as treatment were excluded. Descriptive data analysis was based on Microsoft excel 2000.

Result: Total of 18 patients in GICU were recruited in the study. The result showed that 12 out of 18 patients (66.7%) complied with ASHP guidelines. However, when evaluated based on modified guidelines which was considered other risk factors identified by other researchers incorporate; a total of 17 patients (94.4%) complied with this modified guidelines. There were 4 patients (22.2%) received ranitidine injection/tablet even when patients were taking oral food. Only 6 patients (33%) discontinued ranitidine when patients were allowed oral intake. While 9 patients have renal impairment, only 5 patients' ranitidine dose was adjusted (55.6%).

Conclusion: In conclusion, majority of patients were rationally prescribed ranitidine as stress ulcer prophylaxis. However ranitidine dose adjustment in renal impairment function need further improvement.

Key words - ranitidine, rational, stress ulcer prophylaxis, critical care patients and dosing-adjustment.

The Effectiveness of Acute Hyperglycemia Management

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Acute hyperglycemia is a common problem among diabetes patients and its serious complications including death. The success rate of achieving optimal glycaemic control from acute hyperglycemia treatment in most hospitals is still poor. This study was done to identify the characteristics of patients with acute hyperglycemia, the effectiveness of insulin therapy and the concomitant use of potential hyperglycemia inducing drugs. A number of 52 patients who were admitted to HUKM from March 2003 to April 2004 were selected as subjects. The data was collected retrospectively using a convenience sampling technique. The clinical progress of the subjects were traced from the day insulin treatment was started until their RBS level stabilized or the day of discharge or maximum follow-up of 14 days. The characteristics of subjects which contributed to the highest occurrence of acute hyperglycemia included having hyperglycemia alone (90.4%), female gender (56%), adult age (mean age 54 years), Malay race (53.8%) and having NIDDM (92.5%). Infection (44.2%) was the most common precipitating factor for acute hyperglycemia among subjects followed by poor or non-compliance to medications (21.2%). The initial dose of intravenous ($R=+0.053$), subcutaneous ($R=+0.175$) and intramuscular ($R=+0.809$) Actrapid[®] insulin used did not show correlation with the subjects' pre therapy RBS level. Most of the subjects (63.5%), female gender (36.5%), Malay race (38.5%) and having infection (34.6%) had their RBS level stabilized in more than 14 days. The presence of infection contributed to significant difference ($p<0.05$) in the number of days taken for the RBS to stabilize. There was a significant difference ($p<0.05$) in the level of RBS pre and post of the first dose insulin. The initial dose of intravenous ($R=-0.059$), subcutaneous ($R=-0.083$) and intramuscular ($R=-0.185$) Actrapid[®] insulin did not have any significant correlation with first dose response. The mortality rate was 9.6%. A number of 12 subjects experienced several episodes of hypoglycemia and another 2 had sub-optimal glycaemic control. The concomitant use of diuretics, beta-blockers and their combination did not prolong ($p>0.05$) the number of days taken for the RBS level to stabilize. The effectiveness of insulin therapy was not optimally satisfactory especially in patients with infection.

The evaluation of thrombolytic and secondary prevention in post myocardial infarction design of pharmacy based education program

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Objectives: To evaluate the management of acute myocardial infarction (AMI), with respect to thrombolytic and secondary prevention treatment and the assessment of patients knowledge in secondary prevention treatment.

Design: The list of patients with AMI were selected based on the inclusion criteria derived retrospectively from CCU Admission/ Discharge Registry from February through mid-April 2004. Data were derived from patient medical charts kept in the record office. Demographic data, diagnosis, medical and drug history, thrombolytic use and drugs prescribed upon discharge were recorded and analysed. Eighteen patients who were followed up prospectively were interviewed on their understanding of secondary prevention treatment. Since the target of 30 patients for the interview was not achieved due to low admission rate for AMI during that period, patients on secondary prevention treatment with history of AMI were selected at random from the Medical Ward 1 and 2, HUKM. Those eligible were interviewed and a score of 1 point was awarded for every 'yes' answer (Total score of 100% based on 14 questions). A score of below 50% would be considered poor, 50-74%, satisfactory and above 75 would be excellent.

Results: Due to the different sets of patients in the treatment and interview group, no association could be derived from the data. Demographic data were analysed separately. Malay represented the majority of patients both in the treatment and interview groups, followed by Chinese and Indian. In age-standardised AMI rates, males outnumbered females. In terms of gender, females were older than males in both groups. Indication for thrombolysis was based on Clinical Practice Guidelines on AMI although the 30-minutes door to needle time suggested was not achievable. Streptokinase was used in 20 out of 22 patients eligible patients while alteplase was used in 3 patients. Thirteen of 19 patients developed complications with streptokinase compared to one of the three patients on alteplase. Prescription rates for recommended drugs upon discharge were high, antiplatelets 97.4%, beta blockers 84.6%, ACE-Is, 87.2% and statins at 84.6%. From the interview, 22 out of 40 (55%) respondents claimed that they have received counseling by pharmacists previously. They were identified separately from the group that have not had any counseling before. When compared, the mean total score for the 2 groups (counseled and not counseled) were the same at about 65%.

Conclusion: Pharmacists have big role to play in the management of patients post myocardial infarction. The monitoring of patients after thrombolytic treatment is one area that needs to be concentrated upon based on the high occurrence rate of complications. In secondary prevention treatment, adherence rates to guidelines were high. However, results suggest that there is room for improvement with regard to patients with multiple risk factors such as in diabetes, older patients and smokers. The introduction of Guideline Applied to Practice (GAP) based on the best available evidence of the drugs, test and lifestyle changes are most effective in preventing complications and recurrences in these patients.

The Usage of Antihyperglycemic Agent in Uncontrolled Type 2 Diabetes Mellitus

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Uncontrolled hyperglycemia is a common problem among diabetes type 2 patients. It is often associated with reduced compliance which leads to a failure of oral hypoglycemic agent (OHA) in maintaining patient normal blood glucose level. Therefore this study was conducted to evaluate the management of uncontrolled hyperglycemia using insulin therapy in the ward. All the patients were on oral hypoglycemic agent before hospital admission. This descriptive study was conducted prospectively from January to June 2003 and forty nine patients from medical ward at Hospital University Kebangsaan Malaysia were enrolled in this study. Results showed that 35% of patients who has uncontrolled type 2 diabetes aged more than 50 years old. It was also found that 39% of the uncontrolled hyperglycemia patients were diagnosed to have diabetes mellitus type 2 for more than 10 years. Sixty nine percent of the patients received combinations oral hypoglycemic agent and thirty one percent of the patients received monotherapy oral hypoglycemic agent before hospital admission. Gliclazide was found to be the most common oral hypoglycemic agents used followed by metformin 29% and glibenclamide 12%. Insulin either used as monotherapy or combination therapy showed similar results with 53% and 47% respectively. ACTRAPID® was found to be the most common type of insulin used for uncontrolled hyperglycemia in the ward. Forty one percent of patient blood glucose levels were controlled in less than 5 days. It was also found that there is no significant difference between the types of insulin used and the duration of glycemic control. Sixty nine percents of patients claimed that they complied with the medications. However the results of HbA_{1c} value showed contradicting results where 82% of the patients had HbA_{1c} value above the normal range. Reasons and factors which contribute to the uncontrolled type 2 diabetes mellitus should be tackled to ensure that the management of type 2 diabetes mellitus will become successful.

Trough: Peak Ratio of Antihypertensive Rilmenidine

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Studies have shown that the degree of blood pressure variability is significantly and independently related to cardiovascular risk in hypertension. Twenty-four-hour ambulatory blood pressure monitoring provides the additional information on the antihypertensive profile of a drug. A clinical study was undertaken to assess the effect of an antihypertensive agent, rilmenidine on blood pressure control throughout 24 hours in the Malaysian Population. Thirty seven patients with mild to moderate hypertension were recruited in a single blind controlled study over a period of six months. Non-invasive 24 hour ambulatory blood pressure carried out showed that rilmenidine 1mg and 1mg twice daily have an acceptable trough:peak ratio of $\geq 50\%$ indicating that antihypertensive effect of rilmenidine is sustained throughout the dose interval. The study thus showed that rilmenidine produces a smooth 24-hour blood pressure profile with no excessive fluctuations and satisfactory blood pressure control.

Doctor of pharmacy students intervention on managing drug related problems in hospitalized patient with asthma and chronic obstructive pulmonary disease (COPD) at Buddachinnaraj hospital, Thailand

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The main purpose of this study are 1) to evaluate a Doctor of pharmacy students (Pharm.D.) intervention on managing drug related problems (DRPs) and 2) to evaluate patient's technique in using inhalers. This study was conducted between October and December 2003 at inpatient and outpatient departments Buddachinnaraj Hospital, Thailand. Thirty-one asthma and COPD patients were seen at the inpatient department and at the follow up visit. The Pharm.D students under supervision reviewed medical history, identified DRPs, and managed the problems by collaborating with patients, physicians, and other health care providers. In inpatient department, 19 DRPs were identified in 14 patients (45.2%). These problems included nine improper use of drug (47.4%), five exceeding dosage (26.32%), two unnecessary drug therapy (10.53%), two non adherence (10.53%) and one adverse drug reaction (5.26%). Eleven out of 19 interventions (57.89%) were accepted and carried out. At the follow up visit, six DRPs were found including four non adherence (66.67%) and two improper use of drug (33.33%). All interventions (57.89%) were accepted and carried out. Considering the inhalers technique, before the intervention, 30 patients (96.77%) used inhalers incorrectly. Even though the intervention at the inpatient department significantly improved the use of inhaler in these patients ($p < 0.05$), ten of them (52.63%) were found to use inhalers incorrectly at the follow up visit.

The study showed that Pharm.D. students under supervision were able to identify and manage DRPs. Most of the interventions were accepted and actively carried out. Most patients used inhaler incorrectly. Pharmacist intervention helped rectify the correct techniques. The regular follow up by health care providers seemed to be needed because the recurrent nature of the problems.

Evaluation of Patient Assessment Skills of Pharmacist Working in Community Pharmacies, Bangkok, Whose Applied for Health Care Accreditation from Pharmacy Council: A Case Scenario of Hypertensive Patient

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Purpose: To evaluate the patient assessment skills of community pharmacists in interviewing, providing physical assessment, interpreting laboratory values, identifying patient's medical problems and planning for appropriate treatment.

Methods: Study population were pharmacists working in community pharmacies, Bangkok, whose applied for health care accreditation from Pharmacy council in 2003. Inclusion criteria was pharmacists providing service to a disguised shopper when she presented at the pharmacies. Details of non-compliant hypertensive case going to community pharmacies with a chief complaint of headache were made up. The patient also had diabetes and sometimes took indomethacin for headache. The patient would answer only to question asked by pharmacists and she would ask pharmacists to interpret blood glucose and lipid levels. For blood pressure measurement, the patient would let pharmacists did only if they asked for. An observer would accompany the patient to record pharmacist activity, including questions they asked, level of blood pressure measurement, their interpretation of laboratory data and therapy they provided in data collection from. Data were analyzed by using descriptive and analytic statistics, which were mean, percentage, chi-square test and Fisher's exact test.

Results: From the list of 53 community pharmacies, only 43 of them were included and we counted one pharmacist as a presenter for that pharmacy. The time pharmacists spent with the disguised patient was 12.88±6.01 (mean±SD) minutes. The most common question asked by pharmacists was symptom of headache (95.35%). Only 22 pharmacists (51.16%) measured patient's blood pressure. All pharmacists could interpret laboratory levels, which were blood glucose levels, blood lipid levels and serum creatinine levels roughly correct. Only 5 of them (11.63%) could identify patient's problems completely as hypertension, diabetes mellitus, hyperlipidemia and indomethacin-induced possibly headache and increased blood pressure levels. Six pharmacists (13.95%) referred the patient to hospital and 25 of them (58.14%) recommended patient for life style-modification. Twenty-nine pharmacists (67.44%) gave appropriate treatment for hypertension and headache. Pharmacists who measured patient's blood pressure could identify hypertension problems statistic significantly better than who did not (p= 0.047).

Conclusion: From our study, lack of patient assessment skill might lead to unidentified problems and give inappropriate therapy to the patient. Measurement of blood pressure might help them for identify hypertension problem.

Patient counseling improve patient knowledge and compliance for chronic hemodialysis patients

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Background: Hemodialysis patients are at risk for non-compliance due to long-term polypharmacy that is often associated with complicated dosing regimens. The aim of this study was to determine the impact of pharmacist counseling on improving knowledge and compliance in patients receiving hemodialysis. The data was collected prior to and after the completion of the study.

Methods: We undertook to study hemodialysis patients's knowledge about and compliance with prescribed oral medicines during October 2002 to January 2003. Patients participated the counseling service conducted by a pharmacist for three visits at monthly intervals. They were asked to state the medications' indications, dosages, cautionary information, common side-effects, significant drug interactions, the frequency with which they missed doses, and the actions they took after missing a dose. The study also investigated patients' satisfaction using a questionnaire.

Results: Twenty patients at a university hospital-based outpatient hemodialysis unit participated in the study. Sixteen patients completed the study over the 4-month period. Although 88% and 75% of the patients could recall the cautionary information and dosages, respectively, only two patients (13%) could recall all of their medications' indications. At the end of the study, the number of the patients who aware of side-effects and indications of their medications increased 25% and 50%, respectively. The number of patients missing dose decreased from 81% (13 cases) to 31% (5 cases). All patients expressed good satisfaction with the provision of counseling service by the pharmacist and wished to see the service runs routinely.

Conclusions: Although the sample size for this study was too small for the results to be conclusive, the results demonstrate the potential influence and benefits of pharmacist counseling in the hemodialysis unit on patient knowledge and compliance.

Implementation and Evaluation of an Evidence-based Medicine (EBM) Module for Third Year Pharmacy Students in Advanced Therapeutics

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Objectives: Develop, integrate, implement, and evaluate an EBM module for 3rd year pharmacy students in a therapeutics course.

Methods: Learning objectives were developed. The module began with 4 lecture hours that consisted of reviewing literature search techniques and introductory literature evaluation. Afterwards, students were assigned groups and provided case vignettes for 8 of 12 weeks in the fall semester and twice during a January term. Cases contained an important clinical problem and a hint to a helpful reference. Students developed relevant clinical questions, identified pertinent literature, and discussed the case in small groups. Each group wrote a standard note that included a case assessment and treatment plan, based on medical literature. The note and a WebCT-based quiz on the primary literature source assessed student performance. Effectiveness of the module is assessed by a validated questionnaire of EBM knowledge at the beginning of the year, at the end of the 1st semester, and at the end of the year, following a formal drug literature evaluation (DLE) course.

Results: 60% of students in the course stated the module was helpful. Individual student performance over time and comparisons of the questionnaire results will be performed. Particular attention will focus on what was learned through self-directed learning and the DLE course.

Implications: EBM is important to pharmacy education and practice. This study will assist in identifying the degree in which the learning objectives were accomplished a self-directed learning module versus a formal course. A method addressing teaching EBM will be helpful to students and faculty.

Parallel and Coordinated Teaching of Medicinal Chemistry and Integrated Pharmacology / Therapeutics and a Multi-disciplinary Case-based Workshop Sequence over Two Professional Years

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Objectives: To develop a curriculum structure that would encourage students to apply medicinal chemistry principles in decision making associated with the use of medicinal agents to treat disease.

Methods: A parallel offering of a medicinal chemistry course sequence with an integrated pharmacology and therapeutics course sequence will run across the second and third years of the professional curriculum. A separate recitation course has been created that will allow the integration of multiple disease states and provide an opportunity for medicinal chemistry principles to be reinforced in the context of a patient care focus. Success of the structure will be assessed using our year-end assessment exam. The exam is application based and assesses the students' ability to apply what they have learned to simulated practice scenarios. Feedback from students will be sought regarding their ability to learn the required concepts.

Results: Implementation of this structure will begin with the Spring Quarter of academic year 2003-04. Performance data for the first class will be available for presentation.

Implications: Schools and Colleges of Pharmacy are pushing integration of the pharmaceutical sciences and therapeutic course offerings. This trend is gradually diminishing the strong scientific underpinnings of the pharmacy profession. Graduates today appreciate the application of drug therapy to disease state management but lack a strong scientific understanding of how and why drugs actually work. We anticipate that our experience with this approach will allow us to educate pharmacists who understand how to use medicinal chemistry to help provide better pharmaceutical care.

The International Journal of Pharmacy Education (*IJPE*)

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The International Journal of Pharmacy Education (*IJPE*) is a new pharmacy Internet only journal began in 2002 and published by the McWhorter School of Pharmacy, Samford University, Birmingham, AL, USA. The *IJPE* is a scholarly, peer-reviewed journal. The URL address for the journal is <http://www.samford.edu/schools/pharmacy/ijpe/index.htm>. There is no subscription fee or password associated with accessing the journal on the Internet. Two issues have already been published.

The journal solicits submissions from both the national and international pharmacy community and has a broad focus: clinical pharmacy, pharmaceutical sciences, drug information, pharmacy education issues, international pharmacy, editorials, commentaries and student papers. In particular, student articles that focus on relevant pharmacy issues are highly encouraged; however, student articles will also be peer-reviewed.

The *IJPE* has an excellent editorial board with members from the United States, Korea, Wales and the Netherlands. These individuals are listed on the journal's editorial board Web site. As articles are reviewed and approved, they will be published in the journal.

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