

Clinical Therapeutics

suitable for the majority of patients but not per se for the individual consulting patient.

Patients (or Materials) and Methods: Based on these challenges, emphasis of the course is put on attitude training. The good management of a specific disease/condition comes in second line and is primarily a way for attitude training. The main attitudes to learn are: [1] how to choose the most suitable drug for a target condition and [2] how to accommodate this choice to the individual patient? Students are trained in choosing drugs according to the “WHO guide to good prescribing” and in doing a consultation in a systematic way (the 6-step approach). Key steps are the therapeutic goals and to check whether the first-choice treatment in the formulary/guideline would be suitable for the individual patient. The course consists of plenary lectures and tutorials prepared by homework. The expert clinician is asked to provide the knowledge of the diseases and therapeutic management during the plenary lectures. Tutorials are organized by the pharmacotherapy task force (PTF) in small groups (of ~15 students) with the aim to analyze and process the patient cases using the 6-step approach. Pharmacotherapeutic competence is tested in a separate competence exam.

Results: Threats and opportunities for implementation: [1] Not all pharmacotherapy taught by expert clinicians was evidence based. This led to discussions with clinicians to implement evidence-based pharmacotherapy. When evidence for a treatment is poor or even absent, different schools may teach their own “expert opinion.” This is also explained to students and examples are given. [2] Not all teachers were convinced of the utility of competence teaching and refused to participate or even disturbed the implementation. Therefore, a group of interested tutors has been trained in competence teaching, the PTF. [3] Students’ workload increased by the homework. Some students scored the pharmacotherapy tutorials very low, hoping to get rid of this extra homework. These complaints largely disappeared in the last year or during internships, when trained competences could be used in practice.

Conclusion: Students regularly get positive feedback from their trainers during internships and Erasmus exchanges about their acquired competence in pharmacotherapy.

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PP054—PRESCRIBING COMPETENCE IN RELATION TO CONCEPTUAL AND CONTEXTUAL TEACHING AND LEARNING

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Introduction: There is global concern about the quality of prescribing training in medical schools and the rational prescribing skills of junior doctors. In the Faculty of Health Sciences, University of the Witwatersrand, curricular change sought to reduce the factual burden of learning and enhance evaluative capacities through the introduction of an integrated syllabus delivered via problem-based learning

Patients (or Materials) and Methods: Members of the graduating class of 2008 in the Faculty of Health Sciences, University of the Witwatersrand, were invited to participate in a directly administered cross-sectional survey using an Internet-administered questionnaire (assuring anonymous responses) through the Centre for Health Science Education (CHSE) electronic class noticeboard. In addition, their exit-level examination results were made available to calculate a “prescribing competence” mark.

Results: Despite the new curriculum, graduating students reported a lack of confidence to prescribe. To explore this finding, this paper analyzes prescribing competence in relation to Bernstein’s theoretical framework of the structure of knowledge. Prescribing is described

as a regionalized skill in relation to several singular disciplines. For successful students, the disciplinary knowledge base necessary for rational prescribing decisions is a Bernsteinian vertical discourse with conceptual coherence. Other students, however, cannot distinguish beyond the context of each clinical problem presented, and their resultant learning is segmented and not transferrable. In addition, this contextual learning leads to a subjective increase in volume, since disciplinary knowledge is not incorporated into inclusive principles.

Conclusion: Thus, curricular components including problem-based learning and horizontal integration constrain epistemic access to the structure of rational prescribing knowledge for some students.

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PP055—PERSISTENT FEVER IN A WOMAN FOLLOWING RIGHT KNEE HEMIARTHROPLASTY

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Introduction: Drug fever is a disorder characterized by a febrile response coinciding temporally with the administration of drug in the absence of any other conditions that may cause the fever. It is important for clinicians to suspect drugs as a cause of fevers of unknown origin because failure of prompt diagnosis can lead to prolonged hospital stay. Here we illustrate a case of drug-induced fever.

Patients (or Materials) and Methods: A 45-year-old woman had intermittent fever after an elective revision of her right knee hemiarthroplasty. The initial suspicion was a partially treated septic arthritis, and she was treated with a prolonged course of intravenous teicoplanin and oral rifampicin. Her fever persisted despite antibiotics, prompting referral to our department.

Physical examination revealed a disproportionately well woman who was febrile (38.5). All her investigations showed no evidence of infection. After 5 days of antibiotic treatment, she remained febrile with a high C-reactive protein levels. The possibility of drug fever due to teicoplanin and/or rifampicin was discussed, and both drugs were discontinued. Upon discontinuation, her fever returned to normal and C-reactive protein levels normalized.

Results: Drug fever may have any pattern. The fever typically resolves within 48 to 72 hours, depending on the agent, its elimination rate, and the patient’s comorbidities. The single consistent characteristic of drug fever is the resolution of the fever when the responsible agent is stopped. In our case, the possibility of drug fever was considered because the patient appeared disproportionately well and was not mounting a tachycardic response to an infective process. Septic arthritis was excluded with a negative synovial fluid aspirate. Endocarditis was excluded with a negative trans-thoracic echocardiogram. Blood culture and urine culture did not grow anything. Persistence of drug fever by teicoplanin has been described in various case reports. The fever occurred at doses of 0.12 mg/d and is prolonged with the long half-life of teicoplanin. Rifampicin is less likely to cause fever.

Conclusion: Drug fever is a common but often overlooked condition. Prompt diagnosis is important as it can obviate expensive diagnostic workup and inappropriate use of antimicrobial agents. It should be considered in cases when the patient is disproportionately well with no clear source of infection.

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PP057—THE OPERATIONALIZATION OF ELECTRONIC INN PRESCRIBING

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Introduction: The “International Nonproprietary Name (INN) prescribing project” in Belgium aimed to operationalize electronic INN prescribing for outpatient care in daily medical practice and medical informatics.

Patients (or Materials) and Methods: The operationalization process consisted of 3 phases: (1) expert consultation; (2) review by regulatory authorities; and (3) test phase with stakeholders and end-users.

Results: The INN prescribing project resulted in: (1) operational rules for electronic INN prescribing; (2) the classification of the therapeutic arsenal, according to the operational rules; and (3) a reference database to be implemented in commercial medical software. The operational rules for electronic INN prescribing define valid INN groups as sets of equivalent medicinal products, described by 3 elements: the therapeutic moiety (the active part of the therapeutic ingredient) or combination of therapeutic moieties, the strength (with standardized denominators), and the method of administration (with simplified but standardized options). The operational rules also define 2 categories of exemptions for INN prescribing: INN groups where the first choice of treatment should be continued throughout the therapy period (NO SWITCH) and medicinal product groups not suitable for INN prescribing (NO INN).

Conclusion: Operationalizing INN prescribing for electronic prescribing was a difficult yet feasible assignment. The INN prescribing project resulted into universally applicable operational rules and a corresponding classification of the therapeutic arsenal and reference database. These outcomes can be used by other countries planning to implement electronic INN prescribing.

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PP058—NEW MEDICINES AND DEVELOPMENT STRATEGIES NECESSITATES CHANGE IN LIFELONG EDUCATION OF CLINICAL PHARMACOLOGY

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Introduction: Traditionally, the training in clinical pharmacology concentrated primarily on teaching of rational drug application for students and clinical therapists. Clinical medicines development is another important field of clinical pharmacology that requires a different training approach closely following the emergence of new scientific knowledge.

Results: A modern life-long learning concept for clinical pharmacologists must take into consideration the emerging new technologies of medicines development and application. The appearance of highly sensitive and noninvasive technologies to measure pharmacokinetic and pharmacodynamic parameters makes possible drug investigation in humans using extremely low doses without substantial danger for the volunteers at the very early stage of medicines development. These so-called Phase 0 trials permit to enrich the animal results with human pharmacologic data before initiating the classical human Phase I dose escalation study requiring more extensive animal toxicology. In early clinical development of new types of biological medicinal agents, drug-containing nanoparticles, medical device and drug combina-

tions, new pharmaceutical formulations routinely require a team of clinicians and natural scientists to perform jointly the complex tasks of the early learning phase of clinical medicines development. Beside profound knowledge in their primary clinical specialty, the new generation of clinical pharmacologists needs extensive additional training in the new methodologies of drug discovery, molecular biology, immunology, translational medicine, etc. for efficiently functioning in a multidisciplinary team.

Conclusion: At the Semmelweis University, the teaching of a reorganized postgraduate training plan for clinical pharmacologists was initiated applying the principles outlined above. On the basis of our experience, an outline for a new national curriculum of clinical pharmacology has been developed, which will be presented. The new plan takes over several topics and concepts worked out during the harmonization of pharmaceutical medicine education in Europe by PharmaTrain. A certain overlap in pharmaceutical medicinal and clinical pharmacological curricula is desired, considering that the optimal clinical application of new types of medicines needs much more basic scientific knowledge than the use of traditional medicinal agents.

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PP060—PATENTED DRUG EXTENSION STRATEGIES AND HOSPITAL RESTRICTIVE DRUG FORMULARY: A COST-EVALUATION ANALYSIS

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Introduction: Drug manufacturers developed “evergreening strategies” to compete with generic medication after patent termination. These include marketing of slightly modified follow-on drugs (slow-release formulations, single isomer chiral molecules, active metabolites, or structural analogues/combinations of original patented drugs) and offering high rebates to hospitals that use brand-name or evergreening drugs. The Geneva University Hospitals (HUG) and the Geneva community have different rules indeed. Drug prices are negotiated and prescriptions restricted at HUG, while prices are fixed and prescriptions unrestricted in the community. We examine the impact of listing these drugs in the hospital-restrictive drug formulary (RDF) on the health care system as a whole (“spillover effect”).

Patients (or Materials) and Methods: We linked hospital and community pharmacy invoice office data in the Swiss canton of Geneva to calculate utilization of 8 follow-on drugs in defined daily doses between 2000 and 2008. This database includes >73% of the total of insured patients. To examine the financial spillover effect, we calculated a monthly follow-on drug market share in DDDs for medications prescribed by hospital physicians dispensed in the community (eg, at hospital discharge, in outpatient clinics) in comparison to drugs prescribed by physicians in the community. The spillover effect dynamic was analyzed under robust time series analysis using autoregressive integrated moving average (ARIMA) models.