Abstract

Introduction: The current clinical decision ideally follows the systematic critical evaluation of the best available evidence associated with adequate clinical knowledge. In this scenario, the actual practical medicine are the knowledge of pharmacokinetics and pharmacodynamics, the principles of evidence-based medicine, building the reasoning for building clinical questions and the main mechanisms of action of the classes the drugs. Current clinical practice requires basic knowledge of evidence-based medicine (EBM) and, therefore, skills to evaluate a scientific article, define efficacy, effectiveness and efficiency, and to incorporate and practice its results in light of the knowledge of the classes therapeutically interactions, their clinically relevant interactions and contraindications.

Methodology: We are integrated teaching practices involving the weekly exposure and discussion of three clinical cases that demand the decision based on the best evidence therapies as well as the knowledge of their respective pharmacological classes and their mechanism of action. As a practical study tool, students should construct their active search strategies and problem based analysis on the following steps: formulate clinical questions (PICO-MIC), locate the information available in the literature; critically evaluate the relevant information then use critically for the clinical decision. The formulation of the questions involves the PICO-MIC Acronym: P Patient; I Intervention; C Comparison; O Outcomes; M Mechanism of action; I Interactions; C Contraindications. Using the acronym, the student, in addition to making the decision regarding therapy, encounters other classes of drugs and their mechanisms of action and interaction, developing a critical, applied and significant study. After finding the best evidence about the theme, students should present a summary for discussing, at class, and answer the final decision about therapeutically propose.

Conclusion: teaching new medicine students how could find the correct answers for accurate decision based on presentation of the original research results is needed to make evidence-based decisions and to ensure that limited healthcare resources are used effectively and safely. Evidence-based principles should be followed in reviewing therapies and practices, including alternative therapies.

Keywords: medical learning, therapeutical practices, evidence based medicine.

1 INTRODUCTION

Definitely health care professionals should be prepared to base clinical decisions on the best available evidence. Evidence-based medicine (EBM) is about solving clinical problems [1-4].

In 1992, a group of clinician-teachers from McMaster University, Canada, described EBM as a shift in medical paradigms [1]. In contrast to the traditional paradigm of medical practice, EBM acknowledges that intuition, unsystematic clinical experience, and pathophysiologic rationale are insufficient grounds for clinical decision-making; In addition, EBM suggests that a formal set of rules must complement medical training and common sense for clinicians to interpret the results of clinical research effectively. As Prof Gordon Guyat [1], EBM evidence alone is never sufficient to make a clinical decision: decision-makers must always trade the benefits and risks, inconvenience, and costs associated with alternative management strategies.

The basic curriculum disciplines of medical courses were always allocated in the first years of study and titled as disciplines that would form the basis for the knowledge and clinical application that would be employed in the following years.

Over the last decades with the advancement of science these curricular components have become dissociated from clinical applications.
Molecular studies unrelated to clinical practice may become a reality, or even worse, a barrier to reaching the disciplines of clinical practice. The great challenge for medical education has been to find strategies for the teaching of molecular contents in an applied way. Pharmacology in particular presents an immense variety of molecular mechanisms in order to explain the biological alterations generated by the drugs in the biological systems [6].

Evidence based medicine (EBM) [1-7] is a systematic approach to clinical problem solving which allows the integration of the best available research evidence with clinical expertise and patient values. In most disciplines, EBM is the fundamental component of decision-making driving expectations of the care received by patients and families. This paper explains how to introduce the concepts of EBM and introduces a practical applied model in medical graduation using a decision tree in pharmacokinetics and pharmacodynamics classes and clinical problem based learning cases using a real life clinical scenarios. The major reason for applied EBM is to improve quality of care through the promotes critical thinking. It demands that the effectiveness of clinical interventions, the accuracy and precision of therapeutical choices. It requires medical students to be opening minded and look for and try new methods that are scientifically proven to be effective. It is important that medicine students develop key EBM skills including the ability to find, critically appraise, and incorporate sound scientific evidence into their future own practice.

2 METHODOLOGY

We are integrated teaching practices involving the weekly exposure and discussion of three clinical cases that demand the decision based on the best evidence therapies as well as the knowledge of their respective pharmacological classes and their mechanism of action [1-6].

To incorporate EBM in as practical skill of medicine students, it is important construct a well-built clinical question and classify it into one category (therapy, diagnosis, etiology or prognosis); find evidence in health care literature; critically appraise for validity and usefulness; Integrate evidence with patient factors and evaluate the whole process [1-7].

One of the most difficult steps in practicing EBM is the translation of a clinical problem into an answerable question. These questions are frequently unstructured and complex, and so clear in unexperienced medicine students; so it is fundamental for EBM skills begin with a well formulated clinical question: good clinical questions should be clear, directly focused on the problem, and answerable by searching the medical literature.

A well-structured problematization can facilitate the targeting of the objectives to be achieved. These scenarios actively lead the students to the contents to be studied as tools in solving a concrete situation that can be found in everyday life.

A theoretical support, or better still, a direction on how molecules act in biological systems, allow students to apply this knowledge to their active counterparts in the construction of the response to the case. In this way the molecular content becomes applied because it is a necessary condition for the resolution of the proposed clinical case.

The present study presents how clinical situations experienced by physicians may require pharmacology contents. How do classes of medications interact, how do they interact with other medications, and when can I not use them in therapeutics? They bring to the student the scenario regarding the patient alongside the research for the best evidence of treatment, basic science and clinical resignify molecular contents incorporating them to a solid and critical medical education.

A useful framework for making clinical questions has been suggested by Sackett et al [1,2]. They proposed that a good clinical question should have four components:

- the patient or problem in question;
- the intervention, test, or exposure of interest;
- comparison interventions (if relevant);
- the outcome, or outcomes, of interest.

Thus an answerable clinical question should be structured in the PICO (Patient or Problem, Intervention, Comparison, Outcome/s). Based on our necessities to exposure and apply knowledges in pharmacokinetics and pharmacodynamics concepts, we introduce three more steps on question (Mechanism of action, Interactions, Contraindications). As a practical study tool, students should
construct their active search strategies and problem based analysis on the following steps: formulate clinical questions (PICO-MIC), locate the information available in the literature; critically evaluate the relevant information then use critically for the clinical decision. The formulation of the questions involves the PICO-MIC Acronym

P Patient
I Intervention
C Comparison
O Outcomes
M Mechanism of action
I Interactions
C Contraindications

3 RESULTS

As an example, we starting using a clinical case of a patient with renal dysfunction and atrial fibrillation, with clearly indication for anticoagulation; In this example, we are discussing prescription of the new oral anticoagulants (NOACs), their interactions and contraindications, as well as what is the potential therapeutic indication of this case.

Atrial fibrillation increases the risks of stroke and death. Vitamin K antagonists, such as warfarin, reduce the risks of stroke and death but increase the risk of hemorrhage as compared with control therapy. Therefore, warfarin is recommended for patients who have atrial fibrillation and are at risk for stroke. Unfortunately, due their multiple interactions with food and drugs, and frequent laboratory monitoring, are often not used, as well as rates of discontinuation are high. Thus, NOACs are needed as more safe, effective and convenient to use.

In this example case, building the proposal toll, the students should propose

P: Atrial fibrillation and renal failure
I: NOACs
C: warfarin
O: cardiovascular mortality reduce
M: pro-drug converted into its active form in plasma and liver. Binding to the active site of thrombin.
I: Additive use with different anticoagulants and NSAIDS potentiate the risk of bleeding. Barbiturates may decrease the plasma concentration of the drug by enzymatic induction.
C: Renal Insufficiency, Patients with Clearence of Creatinine

Once they are formulated the clinical question, they are seeking relevant evidence that will help to answer the question. Traditional sources of information such as textbooks and journals are often too disorganised or out of date [9]. Important sources of evidence include the online electronic bibliographic databases, which allow thousands of articles to be searched in a relatively short period of time in an increasing number of journals. The ability to search these databases effectively is an important aspect of EBM [9,10,11,12]. It is therefore important medicine students undergo basic training in search skills, either through their local library services. Numerous online databases are available. These include the Cochrane Library databases, MEDLINE, EMBASE, and CINAHL. In day to day clinical practice, we strongly suggest that becoming familiar with one or two databases will suffice in most cases. I recommend the Cochrane Library databases and MEDLINE. The Cochrane Library databases—which include the Cochrane database of systematic reviews, the Database of abstracts of reviews of effectiveness, and the Cochrane controlled trials register—is maintained by the Cochrane collaboration, an international initiative which began in the early 1990s and was designed to prepare, maintain, and disseminate systematic reviews of health care interventions [4].

MEDLINE is probably the most widely used database for searching the biomedical literature [3,4]. It is maintained by the National Library of Medicine, USA. A version of MEDLINE (PUBMED) is freely available on the internet, is updated regularly, and is relatively user friendly.
With the use of the acronym, the student, in addition to making the decision regarding therapy, encounters other classes of drugs and their mechanisms of action and interaction, developing a critical, applied and significant study. After finding the best evidence about the theme, students should present a summary for discussing, at class, and answer the final decision about therapeutical propose.

During the summary presentation, the students should discuss these fundamental points:

- Was the study randomized and double blind to prevent bias?
- Was follow-up complete?
- Were the groups similar at the start of the trial?
- Were all enrolled patients included in the conclusion of the study?
- Was the study valid? did the authors answer the question?
- Do the results present an unbiased estimate of the treatment effect?
- How large is the treatment effect?
- Will the results help my patient?
- Were the study patients similar to your patient?
- Are the benefits worth the harm and cost?

4 CONCLUSIONS

Teaching new medicine students how could find the correct answers for accurate decision based on presentation of the original research results is needed to make evidence-based decisions and to ensure that limited healthcare resources are used effectively and safely. Knowledge acquired in pharmacology applied to mechanisms, limitations and interactions can produce in the student the critical ability to avoid undue associations, to consider the specific characteristics of the patients, improving the health service, optimizing costs and reducing the adverse reactions resulting from drug interactions. Evidence-based principles should be followed in reviewing therapies and practices, including alternative therapies.

REFERENCES