

Evidence-based medicine: new wine in old bottles?

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Abstract

The general idea of evidence-based medicine (EBM) and its practical realization are presented and the concept of EBM is discussed from the general methodological point of view. The principal practical merit of this paradigm consists in fostering precision and reliability in the process of solving medical practical problems and its contribution to the general medical knowledge. The emphasis of the EBM approach on direct application of the results of clinical trials should not, however, be introduced into practice to the detriment of the use of theoretical medical knowledge and “classical” methods of reasoning.

Key words: evidence-based medicine, best evidence, observational terms, theoretical terms, clinical problem solving, general survey.

Evidence-based medicine (EBM), a methodological idea, called by its founders “a new paradigm”, appeared in 1992 [1]. The main line of development of this concept [2,3] is connected with the direct application in the clinical practice [4,5]; recently, however, the same term is used also in a more basic sense of a type of general clinical methodology [6], in both above varieties, the idea of EBM have strong epidemiological and statistical background. The present work concerns rather the first approach.

The appearance and development of EBM was promoted by the conviction of its authors that medical knowledge the physicians are using in practice, as well as the traditional sources

from which it derives, are mostly outdated and that the typical way of doctor’s reasoning based mainly on pathophysiological knowledge no more fulfills the needs of modern medicine. Recently, however, the remedies, that may improve this situation have appeared; they consist first of all in a rapid progress and implementation of statistical methodology of clinical research together with the development of the technique of storing huge amounts of data and an easy and fast retrieval of information thanks to the development and practical application of Internet. The joint effect of these factors brings about the possibility of spreading and use of the results of clinical and other studies almost without delay; from the EBM point of view, the most important is an immediate accessibility to the results of multi-center prospective clinical trials embracing thousands of patients, performed according to rigid statistical criteria and generalized by means of meta-analysis. In this situation it may be possible as well as desirable to put into effect the postulate of grounding everyday practice of solving diagnostic, therapeutic, medico-economic and managerial problems on data and general statements deriving either directly from the most recent results of clinical research, either from review articles, websites, guidelines, books etc. prepared especially for this purpose. In order to promote and develop this activity, periodicals and journals, numerous working groups, centers and institutions appear in various countries the ensemble of which may be called EBM system or network (e.g. ACP Journal, The Cochrane Library, BMJ series of evidence-based books devoted to many specialties etc.). Thus, in general terms, EBM is in the same time a postulate based on the assessment of the present state of medicine, a kind of methodology, a suggested direction of the development of medical practice, a set of methods of delivering medical care, and a system aimed at assisting this approach. The most specific general aspect of EBM consists in the fact, that the term “medicine” in this contexts is understood not in the sense of a certain field or discipline, but as medical activity performed in a certain way which may or should be applied to every medical specialty. Hence the belief of the promoters of this movement in its general importance, overall applicability and uniqueness;

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such an attitude, by the way, rises discussion [7,8], critical studies [9,10], even satirical papers [11].

Definition and role

According to Sackett [7] “evidence based medicine is the conscientious, explicit, and judicious use of current best evidence in making decisions about the care of individual patients. The practice of evidence based medicine means integrating individual clinical expertise with the best available external clinical evidence from systematic research”; a similar definition is given in his seminal book [1] and by other authors. As concerns the practical use of EBM methodology in the process of solving problems related to individual patients, the following steps or phases are recommended: formulation of a clear clinical question, search of the literature for relevant clinical articles, evaluation of the evidence for its validity and usefulness, implementation of useful findings in clinical practice [4].

The practical application of EBM resembles – in a more diversified and flexible form – the systems supporting clinical problem solving based on the use of statistical data, other mathematical methods and/or artificial intelligence. The idea of computer support of physician’s thinking consists in endowing him or her with relevant external information together with a proposition of application of a certain method of inference making and a suggestion of a probable or possible solution of a given problem. The EBM systems fulfill comparable functions either by means of suggesting problems’ solutions based on especially retrieved and prepared results of clinical research, or by providing (collected also directly for a given purpose) a piece of the most recently accepted general knowledge.

As concerns the contents of pieces of evidence in the EBM meaning which may be used in the process of medical problem solving, three main categories may be distinguished: a) up-dated fragments of knowledge presented as reviews containing epidemiological, pathophysiological and clinical information, b) the results of the most recent and reliable research (mostly clinical trials) published as papers in the form of research reports, c) schemes and models of diagnostic or therapeutic action, guidelines and suggested solutions of particular problems.

Pragmatic and theoretical aspects

From the methodological point of view, the manner of understanding and application of the notion of “best evidence” (“current best evidence”) is of crucial importance. According to Sackett [1] “by the best research evidence we mean clinically relevant research, often from the basic sciences of medicine, but especially from patient-centered clinical research...”. In general terminology “evidence” means “something that makes another thing evident, indication, sign, something that tends to prove, ground for belief” [12]. In empirical sciences the ultimate criterion of truth is observation, the majority of statements, however, are accepted on the grounds of indirect, usually long and complex, relations with the external facts, and the scientific knowledge is composed of observational statements as well

as theoretical ones. In the context of EBM methodology, the “best evidence” means first of all the evidence based directly on clinical studies (i.e. a kind of systematic observation), while the majority of “textbook laws” belong to the class of theoretical statements. The problem solving reasoning, including decision-making inference, consists in mental operations performed on complex sets of propositions, the majority of which (theoretical ones) are based on the observational ones only in an indirect way. In order, however, to accept or reject these judgments, it is necessary to refer to the observation (experiment), the validity of which requires application of statistical methods. The statistical methods, therefore, are related in the first place to the process of verification of hypotheses, while that of their formation (with the exception of the starting phase) is based mainly on theoretical statements. In other words, for some purposes the observational statements (i.e. close to the experiment) may serve as the best evidence, for other ends – the pieces of theoretical (i.e. abstractly enriched) knowledge, whereas always the best evidence is composed of both types of statements in various proportions.

Some suggestions

In the light of the above considerations, a full realization of the postulate (stated, e.g. in 1) of integration of statistical “best evidence” with the medical general knowledge and expertise appears especially important; a broader theoretical analysis of this link, however, could make its application more effective. It seems, moreover, that special emphasis should be put on the process of problem (clinical question) formulation (see, e.g. 1, 4) in the initial phase of clinical reasoning. Special attention should be given to the individual patients’ features (somatic as well as psychic) and the sphere of values which cannot be effectively integrated into the problem solving framework without the use of theoretical knowledge. Other fundamental questions are connected with the applicability of overall results of clinical trials to individual patients [13,14] and with the relation of the notions of quantitative versus logical probability [15] as well as the subjective uncertainty in medical consultation [16].

To sum up, the development of the EBM “paradigm”, methodology and decision support system brings about useful and interesting results and becomes one of significant factors of the progress in medical practice and science. The application of EBM accelerates the incorporation of the results of clinical research into the general bulk of medical knowledge and promotes the use of reliable and precise information in practical medical problem solving. These effects, however, could be made more valuable, if the spreading of the EBM approach were accompanied by a more refined theoretical analysis of relevant methodological problems.

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