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EDITORIALS

The Nature of the Diagnostic Process

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In this opinion article, the authors' purpose is to present the general course of arriving at a diagnosis from the moment a person enters the office of a doctor to the discussion about the doctor's opinion with the patient that rounds off the contact. In medical education, the student mostly is confronted with a textbook style of diagnosis. However, the authors sketch different diagnostic styles that a physician might engage in, depending on the nature of the problem, the patient, or the doctor him- or herself.

One does not need a doctor for a 'common cold' or a graze. For more serious problems, from now on 'complaints,' one goes to a doctor. A patient's goal is to have the doctor pay attention to his complaint, provide him with an explanation of the probable cause, and information on the course, the prognosis, and the treatment. The first phase in arriving at a diagnosis is to determine the cause of the complaint; diagnostic process or diagnosis for short. In about 90% of the cases, the doctor succeeds without much difficulty. However, the complaint may be difficult to place and in about 10–15% of patients this results in a temporary misdiagnosis.

Adequate diagnosis requires a great deal of knowledge about the structure and function of all parts and systems of the body, knowledge of pathogenic organisms and harmful environmental factors, the way in which the body reacts to them, and so on. All or parts of these factors may interact in isolation or in a variable manner in time and intensity. Diagnostics is or should be a scientific judgment and is sometimes complicated. It is reminiscent of the detective work of Sherlock Holmes whose spiritual father, Conan Doyle, was a doctor and who based his fictional detective on the diagnostic methods of the surgeon and lecturer Dr Joseph Bell.

Diagnostics requires not only an analytical mind and a great deal of knowledge, but also skill and experience. Skills in communication, listening, understanding body language and keen observation are essential.

In the current efficiency-oriented practice, a practice assistant records the social data: date and place of birth, gender, race, place of residence, profession, marital status or variants thereof, and so on. The patient then takes a seat in the waiting room. Little attention is paid to the consequences of history-taking by assistants in the literature on logic in medicine, which includes diagnostics. Nevertheless, discrepancies can be noticed when collecting these data, such as between biological age and calendar age, effects of occupational diseases and so on. A patient with sun-tanned skin is more likely to get skin cancer than a nun, and a dark skinned African very rarely gets cancer from moles. A man does not get women's diseases and a child does not get age-related hearing loss. Furthermore, a doctor should not be influenced by politically correct or incorrect prejudices in his diagnostics.

1. The diagnostic process

In the consulting room, the diagnostic evaluation already starts during the greeting (how the patient enters the room, eye contact, posture, handshake, personal care, etc.). The patient presents his complaint, the doctor listens and responds with questions. The interview between doctor and patient is called anamnesis. The factual answers are important here, as is the way in which they are presented and explained. During the first consultation, after asking about the complaint, the 'tractus' (body system) to which the systems related to the complaint are examined (often more than one

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system) and then all other ‘tracti’, previous health aspects (medical examinations, operations, illnesses, traumas, education, profession, medicines and recreative drugs, family, social background including profession, hobbies, travel, etc.). In the vast majority of cases, this gives a doctor an adequate idea (1–4 probable causes) of the pattern of complaints. Through further questions and specific physical examination, looking, tapping (percussion), listening with a stethoscope, feeling with the fingers and hands (palpating), smelling, he or she sometimes finds information that will help him or her further. In daily practice, anamnesis and physical examination combine and additional questions will be asked during the physical examination.

The discussion about the doctor's opinion with the patient rounds off the contact. It may be necessary to add simple additional examinations such as height and weight, laboratory examination of body fluids and secretions, X-rays, etc., or to request a consultation from another doctor, another specialty or from paramedics such as optometrists and speech therapists and a growing number of other disciplines.

What we have described here is the formal ‘model’ of diagnostics as is presented to the student. What follows are variations on this.

The diagnostic process is very rarely or never discussed as a specific subject of attention in the medical curriculum. Formal reflection and research in this field did not appear until the 1960s, [1–3] reviews in this century. [4] Medical education still follows the old guild model in which clinical skills are acquired by copying the art from the elderly, nowadays aided by practice in a ‘skills laboratory’.

Tomassi writes that the traditional view of how a doctor makes a diagnosis is based on a process based on intuition, [5] a mysterious property with little explanatory power. However, he himself believes that a diagnosis is a scientific judgment ‘par excellence’ and should therefore be approached as a rational process. In doing so, he expresses most of the views in the literature. He writes that this process consists of inductive reasoning, partly also deductive reasoning or both together. Tomassi is a philosopher and has written an important book on logic.

Different approaches to diagnostics can be distinguished:

1. The ‘blunderbuss method’, which students usually start with. For each complaint or symptom, “all the textbook tables” are reviewed and one possibility after the other is crossed off until finally a few “remain” that require additional

investigation before the most likely one is selected.

2. Algorithms follow a kind of flow chart in which the prospective doctor mainly answers with ‘yes’ or ‘no’ at nodes and at the end of that ‘automatically’ arrives at the ‘correct’ answer. The basis of this lies in the Boolean logic, the same system on which computer programs are based.
3. Modernized, the same pattern is followed in computer medicine. A problem is that a lot of useless information is gathered and unnecessary further investigations are often performed. The main motivation for excessive use of investigations appears to be ‘defensive’ against legal claims of misdiagnosis. In addition, often minor ‘abnormalities’ are found that can lead doctors down the wrong path. For weighing of answers, a lot of information has to be collected that is often not available if ‘Cochrane’ style analyses have not been reported-i.e., carefully compared information obtained from ‘double blind clinical studies’.

Diagnostically, a bigger problem is that ‘open questions and answers’ are difficult to include in computer-based algorithms and questionnaires. Self-thinking is not advocated, rather discouraged and the doctor is relegated to a kind of computer follower.

4. The hypothetico-deductive method, a form of ‘educated guessing’ (formulating hypotheses) and testing, which relies more on corroboration (confirmation) than on Popper's [6] (more radical) falsification, which Tomassi rightly rejects as completely useless for diagnosis. Hypothesis formation relies on expertise and obtaining expertise takes a lot of time, concentrated attention, and knowledge. Every doctor refers to what he calls pattern recognition or intuition. To date, it has not (yet?) been possible to successfully convert involved pattern recognition and intuition into computer language. The art of diagnosis involves paying attention to “gut feelings” that something is wrong without initially being able to define what it is that is wrong. It is the realization that ‘somewhere’ in the clinical ‘picture’, the picture manifested by the patient does not completely match what is known about it in the clinical. Being able to pay attention to this prevents misdiagnoses.

Conflict of interest

The authors of the manuscript declare that there is no conflict of interest.

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