Medical Hypotheses

Medical Hypotheses (1995) **45**, 331–334

Normative Medicine

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Abstract — Normative medicine is a new approach to health and disease based on Canguilhem's philosophy: *The normal and the pathological.* In the past, disease was nearly synonymous with ill health. Advancing technology reveals more and more pre-clinical aberrations that are not fully fledged diseases, and cannot be regarded as ill health. Medicine lacks clear guidelines for dealing with them. While competent in specifying *how* to treat, it generally fails to decide correctly *when* to intervene in the evolving process. This is the main source of medical iatrogenesis. Normative medicine is more concerned with health itself and less with diseases. It provides criteria when to intervene in the disease process.

Introduction

The tremendous success of the exact sciences in explaining natural phenomena has a great impact on modern medicine. Technology introduced into medicine new ways to study disease. The language of physics is applied in cardiology to describe heart mechanics. Non-linear dynamics tackle the fibrillating heart. Action potentials obey the laws of electricity. Will these turn medicine into a scientific discipline? 'Yes indeed!' is the answer of the medical establishment. Once medicine adopts the reductionistic approach of the exact sciences, it will turn into genuine science. Diseases are no more than genetic aberrations that will ultimately be corrected by molecular engineering. Genome mapping is therefore essential for understanding disease.

Diseases do not exist as such in nature

On the other hand, are diseases real entities like atoms and molecules, that can be uniquely defined? Diseases continuously evolve and change their manifestations. Are they real entities, or ways to communicate between practising physicians? Ludwik Fleck, a yet unknown philosopher of medicine believed that diseases do not exist in nature but are constructed by physicians for didactic reasons. 'It is easier to find one's way in a forest than in botany. It is easier to cure a patient than really to know what his disease is' (1–3). Diseases do not exist as such, there are only sick people, and yet our education systems produce mainly disease specialists. They may understand 'basic biological phenomena', and know how to treat some diseases, yet the crucial question is not only how to treat but when to intervene.

Diseases evolve

Technology revealed also that diseases evolve. While ancient diseases fell upon the patient, modern diseases emerge. They start as small aberrations without clinical

Date received 2 February 1995
Date accepted 12 May 1995

manifestations, while the patient feels healthy. When he feels ill, disease starts its clinical course. Advancing technology reveals more and more pre-clinical aberrations, and medicine lacks clear guidelines for dealing with them. To wait until they become more pronounced is generally regarded as malpractice. Medicine presumes that the traditional guideline 'primum non nocere' results from ignorance and helplessness, and should not be practised. Yet technological innovations endow this concept with a new meaning, e.g. 'Do not harm, and don't interfere until the aberration ripens for treatment'. Lacking clear criteria when to intervene, medicine tends to treat whenever an aberration is detected. Some treatments are clearly unnecessary, and yet the specialist cannot refrain from treating, since 'primum non nocere' is forbidden. At best treatment is justified as a preventive measure.

Medicine has reached a conceptual impasse. While competent in specifying *how* to treat, it generally fails to decide correctly *when* to intervene in the evolving process. This is the main source of medical iatrogenesis.

Chaos

Even in physics, reductionism works only under two conditions: The frame of reference in which phenomena are studied, changes in a linear fashion, and interaction between elements is negligible. In the organism, on the other hand, all elements interact and the frame of reference in which diseases evolve is non-linear. The exact sciences lack conceptual tools to deal with such non-linearities. In certain cases they are approximated by semi-linear models. Most non-linear phenomena, known as chaotic, cannot be approximated linearly.

Confusion in epidemiology

While in the exact sciences reductionism is a way of describing natural phenomena, in medicine it breeds iatrogenesis; like in epidemiology that indiscriminately reduces complex phenomena to meaningless entities. Epidemiology is in a state of a profound conceptual confusion unnoticed by the medical establishment that regards it as an oracle. This alarming state was exposed in *Follies and fallacies in medicine* written by two renowned epidemiologists (4). Four basic flaws underlie epidemiology: 1) they ignore the difference between individual normal and statistical normal, or average; 2) medical phenomena are treated as random variables; 3) complex evolving processes are simplified ad absurdum; 4) association is interpreted as a cause and effect relationship.

Norm and normal

Although 'normal' has many meanings, only two are medically relevant, the individual normal, or norm, and the population normal, or average. Norm represents the condition of the organism in the circumstances in which it lives. Average is observed in the majority of cases. Epidemiology maintains that average is the best estimate of the norm. Deviations from the average are random and medically irrelevant. The mean blood glucose level in a healthy population is also the norm of the individual. Yet such a simple relationship does not always hold. Take for instance the pulse rate of 50 beats/min in a healthy athlete. From the viewpoint of the population it is a bradycardia, while in reality it is the athlete's normo-cardia. The individual norm cannot be deduced from the average, neither is its deviation random and medically irrelevant.

Epidemiology attempts to side-step this difficulty by grouping individuals into functional classes, each with its own normal average, which is virtually impossible. What about the normal pulse in pregnancy, or how to account for nervousness. These examples reveal that generally norm and normal cannot be equated. For some patients in the population like the athlete, the average will always be abnormal. For them, equating norm and average is iatrogenic. This is also the case in most epidemiological studies.

Machine statistics cannot be applied to humans

Mathematical probability is based on the concept of an independent random or stochastic variable. The central limit theorem that underlies epidemiology, presumes that random phenomena observed in epidemiology will ultimately settle at a 'central limit value'. The greater the sample the more reliable it is, which only seldom applies to medicine. The central limit theorem applies to humans only if reduced to single points. Epidemiology presumes that for practical purposes humans can be approximated by a single point, which leads to absurdities like the normo-bradycardiac athlete. While here the fallacy is obvious, generally it is subtle and therefore iatrogenic.

Medicine is less concerned with the central limit itself and more with medically meaningful deviations from the average. Any treatment may be harmful to some patients. In order to find who they are, each patient has to be observed individually. All that epidemiology can say is that some patients deviate from the

average, but it cannot specify who they are, which is the main concern of the clinician.

Medicine ought to realize that norm and average cannot be equated, since some patients will never be represented by the average. It should therefore disregard epidemiological advice concerning treatment. Clinical trials are epidemiological constructs with flaws that were mentioned above. A complex evolving process, like cancer, is reduced to a single point. Patients are stripped of their individuality and become randomly assigned points. The average treatment is then indiscriminately applied to all patients disregarding those that will be harmed by it. Clinical trials are iatrogenic.

Ludwik Fleck

Amidst this confusion emerged two giants, Ludwik Fleck and Georges Canguilhem. Fleck was interested in the philosophical theory of reality rejecting any absolute and objective criteria of knowledge. There is no objective and absolute truth. Truth in science is a function of a particular thinking style by a group of scientists, or thought-collective. A thought-collective is 'a community of persons exchanging ideas or maintaining intellectual interaction'. The individuals of a thought-collective share the same thought-style. Truth and falsehood in science are meaningful only within a specific thought-collective and with respect to a given thought-style and depend on the purpose of investigation. Different views can be equally true (1–3,5).

A scientific fact does not exist, rather it develops: 'Sciences do not grow as crystals, by apposition, but rather as living organisms, by developing every, or almost every, detail in harmony with the whole'; 'The process of cognition is not a two-term one . . . It does not occur solely between an abstract subject and an equally absolute object. The collective is incorporated into this process as a third member'; 'Between the subject and the object there exists a third thing, the community. It is creative like the subject, refractory like the object, and dogmatic like an elemental power'.

Georges Canguilhem

The normal and the pathological are two pillars of medicine. The normal is symptomless and is not perceived. Only the pathological draws our attention and through disease we appreciate the normal. Despite this, the pathological is defined as a deviation from normal. What is then normal and when does a deviation from it become pathological? This profound question was addressed by the greatest minds of modem medicine and their views were summarized in 1943 by the philosopher and physician Georges Canguilhem (6,7).

Canguilhem distinguishes between norm and average. The norm represents the condition of the organism at any time. It is maintained actively and continually adjusted. Among other, the norm maintains an equilibrium known as homeostasis. Unlike the equilibrium of a chemical reaction that is established passively, homeostasis is maintained actively. Since maintaining its norm actively the organism is normative. 'Normative in the fullest sense of the word, is that which establishes norms.' Homeostasis is maintained even if the organism undergoes conspicuous changes, e.g. in the growing child, when growth proceeds from one homeostasis state to another, or from one norm to another. The knowledge how to create an appropriate norm was called by Cannon 'Wisdom of the Body' (8,9).

Canguilhem's book provides new definitions of disease and health that ought to be considered by medicine: 'Disease is not merely the disappearance of a physiological order but appearance of a new vital order'; 'Disease is a positive, innovative experience in the living being and not just a fact of decrease or increase'; 'Disease is not a variation on the dimension of health; it is a new dimension of life'; 'Disease is a narrowed mode of life, lacking in creative generosity because lacking in boldness, it is nevertheless true that for the individual, disease is a new life' (6).

Normative medicine

The two philosophers should be regarded as medical relativists. Diseases are not absolute entities, and do not exist as such in nature. Their course is directed by the wisdom of the body. Each is a new form of life. This philosophy paves the way for a new medicine that considers the organism's normativity during treatment and is called here normative medicine.

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