

Uncertainty and Its Consequences in Clinical Practice

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Medicine is an imperfect science and practitioners rely on the best evidence available. Even when diagnosis and treatment are guided by standard procedures and protocols, uncertainty is to be expected from time to time. Uncertainty affects patients, physicians, and medical systems, so it is a pressing issue for all.

For example, a failure risk of 1% for a surgical procedure seems sufficient to explain uncertain outcomes. However, further exploration of seemingly statistical data would only confirm the extent but not the content of the uncertainty. According to Descartes' criteria, uncertainty is a "distinct" concept but not a clear one (1), something like the concept of "death," which is vividly distinguished from life, but whose connotations are unclear and unknown.

The context of uncertainty is not science and may even be beyond rational thought. Because of this, the psychological, emotional, and ethical aspects of uncertainty often confound the doctor-patient relationship, resulting in suspicion and hostility. Ultimately, patients may wonder whether to attribute failure of a diagnosis or treatment to existing risk or to medical negligence.

How medical practitioners establish the boundaries of certainty is related to the scope of their clinical obligations. In general, attention to the latter by medical personnel falls within the range of reasonable medical certainty, which is governed by the strength of the association between cause and effect and our knowledge of it. What, then, is the cause-effect relationship?

We know that all understanding of natural science rests on the principle of causality, and the purpose of medical research is to understand causality, which explains some of the relationships among events and renders the events more meaningful. Medical personnel are trained to give a theoretical explanation of events, further developing their abilities to predict and manipulate events. The professionalism of medical staff is mainly defined by their related causality training. From a pragmatic perspective, two types of causality may help us define professional obligations better; event causality and agent or strategy causality. The objective structures of causality (event causality) define the extensive obligations of professionals on an ought-

to-pay-attention-to basis. The objective structures of causality depending on contextual conditions of the agent (agent or strategy causality) define the obligations on a could-be-paid-attention-to basis.

For example, when we consider that allergy to an agent may cause death, a severe allergic reaction to injection of radiological contrast media could be predicted to cause death in about 1 per 170,000 (2) to 2.1 per 1 million cases (3). The objective obligations of the ought-to-pay-attention-to and could-be-paid-attention-to basis in clinical practice are to keep the fatality rate under these rates.

In clinical practice, our range of responsibility extends from what we "ought-to-pay-attention-to" (as determined by evidence-based medicine and local medical professional custom) to what we "could-be-paid-attention-to" (as determined by the clinical situation at the time and "rational physician standards"). Complying with the above-mentioned duty to make a professional judgment is at the discretion of the physician. Some important distinctions can be made: medical error can be due to not following local medical professional customs and rational physician standards, whereas malpractice is intentionally improper and against local medical professional customs and rational physician standards. Although in accord with local medical professional customs and rational physician standards, medical uncertainty does not lead to the expected clinical outcomes.

However, once unexpected medical failures are encountered, the range of certainty as defined previously by causality or medical professionalism immediately collapses because medical failures are beyond the scope of expectation and interpretation. Apparently, uncertainty remains an open concept, not yet having been explained.

Now, what is uncertainty? Uncertainty typically means that the outcomes of events cannot be accurately predicted, owing to unclear causes of incidents in an unknown field. Therefore, uncertainty is a failure of causality. If professionalism is defined by causality, then uncertainty would harm the professional's reputation. This is the first impact of uncertainty. Uncertainty not only conflicts with the principle of causality, but also com-

promises the professional image and status of the medical personnel.

Moreover, that uncertain events by definition are inexplicable and unpredictable is a paradox. If a fatality occurs, whether the presumed rate of fatality caused by contrast medium injection has been kept under 1 per 170,000 to 2.1 per 1 million is unprovable. We cannot distinguish an accident from a chance allergic reaction beforehand, or even afterwards, owing to uncertainty. Nor can we predict that a similar event would or would not occur next time. Thus, the second impact of uncertainty is that it negates the possibility of providing proof that directly addresses the accident, as proof and uncertainty are mutually exclusive.

The impossibility of giving patients proof is tantamount to asking them not to request explanations, to forgo any rationale, and to admit to themselves that no reasons have been found. It is more appealing to prove medical negligence and for patients to believe that something could have been and could still be done for them than to accept the inexplicability of accidents. When an accident or adverse event does occur, the patient may behave more aggressively, which is a rational reaction. On the other hand, the smaller the probability of an accident occurring, such as during a routine examination, the more inclined the patient is to accept the accident as due to negligence, because human negligence is obviously a more reasonable explanation. Thus, the third impact of uncertainty is irrationality, which tends to support the patient's acceptance of medical negligence.

Standard clinical procedures are determined by evaluating causality and establish the ought-to-pay-attention-to responsibilities of professionals. The actions involved are just one factor (efficient cause is one of Aristotle's four causes). An accident occurs when the action taker is paying attention but cannot confirm the exact cause of an incident (with a subject for blame) because it is caused by the uncertainty itself. Even if we all agree that "every event must have a cause," it is not easy to accept that impersonal uncertainties are the main causes of accidents. If the person responsible for an accident cannot be identified, the disquiet of doctors and patients could pose difficulties for the doctors explaining the situation. Therefore, the fourth impact of uncertainty is that avoidance of responsibility leaves the patient with a negative impression and leads to collapse of the mutual trust between the medical staff and patients.

If there is no control of the cause-and-effect relationship as well as lack of solid evidence to explain the causes of an accident, then the doctor-patient relationship must be determined by trust rather than professionalism. The patient has more proactive decision-making power under such conditions, that is, trust or suspicion of the medical staff is at the patient's own discretion. If patients have the impression that medical personnel are avoiding responsibilities, doubt the statements of the medical staff, and suspect that facts may be hidden; it is likely they

will take legal action. It is because medical uncertainty can cause the same result as medical error; the difficulty of understanding and accepting medical uncertainty is increased or even used as an excuse to cover up medical error. Perhaps medical systems can develop a plan of medical uncertainty disclosure comparable to that of medical error.

In conclusion, the phenomenon of uncertainty is complex and worth further attention from medical professionals. Although uncertainty is unavoidable, we can reduce its negative impact. Medical professionals and patients can discuss the aspects of the uncertainty together, but we must understand that uncertainty is not only a concept of statistical evidence-based medicine, it is beyond professional objective interpretation, and therefore, it is a problem of emotions, thinking processes, and feelings. If we could be aware of this and pay attention to communicating using non-professional language with the patients, it would be extremely helpful for maintaining a good doctor-patient relationship. More importantly, in order not to endanger the fragile doctor-patient relationship, a relationship of mutual trust should be established through empathy and sincerity.

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