

# To see or not to see: that is the question

Barros Veloso\*

### Abstract

The author makes some observations, concerning the importance that the ability to visualize organic lesions has made, to the evolution of Medicine. Particular reference to the imaging techniques in CT scans, optical fiber instruments and micro-cameras, available since the early 80ties, is made emphasizing the consequences

which these new techniques have introduced to the practice of traditional Clinical Medicine.

Key words: image, X-rays, computerized axial tomography, jaundice, ampulla of Vater.

For as long as I can remember, I have always heard that in contrast to all other creatures, Man is a rational animal. That means that only man is able, besides other things, to communicate using symbols and develop abstract concepts. Thanks to this ability, he can imagine scenarios far beyond basic appearances, and afford the luxury of creating solutions to merely speculative problems that he may or may not use to his advantage in the future.

There are innumerable examples, but I cite just two that seem simple and particularly significant to me: the early representation of the globe exactly as it would later be photographed by satellites; the detailed description of the various phases of the inflammatory process, subsequently revealed to be precisely that, when filmed under high magnification.

Nevertheless, it is curious that, armed with such a voluminous “tumor of neurons” which gives him all these abilities, Man reveals a compulsive attraction not for abstract thought, as would be expected, but rather to the image?

There are various popular sayings that consider direct vision to be the most perfect criterion of knowledge. “Seeing is believing.”, “That remains to be seen.”, “It is staring you right in the face.” are three perfect examples of this. But if any reservations still lingered about how important visibility is to Man,

the appearance of television would dispel all doubts. For hours on end, citizens of this planet live bound by their fascination with the image, and it can be said that currently from a sociological perspective only what happens on the “small screen” exists for real: “Il n’est d’événements que visibles. Pas d’images, pas de drames. Pas de caméra, pas d’intérêt” (Bruno Frappat).

As such, it seems logical (though for different reasons) that Medicine would not escape the fate that has come to establish images as the supreme revelation. On second thought, medical knowledge has always been conditioned by the state of seeing or not seeing, and it is this simple alternative that has been somehow present for the whole fascinating journey that is worth summarizing here.

As is known, little more than a century ago doctors only had access to external sicknesses, which they tried to understand, treat and cure, within the known limitations. Ulcers, fractures, gangrene, wounds and some “tumors” were all grouped into a vast nosological category that later came to be known as “External Pathology”. All of Medicine’s remaining space was occupied by mysterious symptoms and signs resulting from incomprehensible phenomena. Fevers, cramps, convulsions, jaundice, dyspnea, paralysis and dementia all originated from invisible causes. Throughout the history of Medicine, bizarre and sometimes delusional theories were proposed to explain them. This is the case of the “doctrine of the four humors” (which, born in Antiquity, would survive until the 17th Century), of the vagaries of Paracelsus around a kind of “anthropological cosmology”, and of other later and less important systems, like “solidism” and “vitalism”.

With the birth of pathological anatomy as we

---

\*Head of the Service 1 of the Hospital Santo Antonio dos Capuchos, Lisbon

understand it today, everything would change. Its founder, Morgagni, did not stop at examining corpses for changes in normal anatomy that could be the source of the sickness: he simultaneously studied the history of each case, trying to relate the sicknesses to the clinical symptoms.

By the end of the 19th century, the slow and patient accumulation of this information over more than a hundred years would give birth to a new discipline: Internal Medicine. Internists, faced with the clinical symptoms of their patients, would try to guess what sicknesses their morphologist colleagues had encountered in similar cases, via autopsy. They thus established anatomic-clinical correlations, and by simple extrapolation (or as we say today, “the intelligent manipulation of standards”) attributed to each clinical profile the underlying sickness or sicknesses. Internists were expected to make morphological diagnoses from indirect data furnished by a virtuous clinical semiology; to be capable of seeing that which was not visible.

Meanwhile in 1895, Roentgen discovered x-rays and made possible something that was incredible for the times: to see through opaque bodies. Medicine, anxious as it was to take a peek inside the human body to see what was going on, could not resist the opportunity. Radiology then became the permanent and irreplaceable companion of those engaged in the discovery of the causes of organic diseases. But the limitations of this technique were well known: two-dimensional black and white images; the confused overlapping of several planes; numerous non-opaque, and therefore invisible, structures. Various steps were taken to try and overcome these difficulties, sometimes with less than brilliant results: the use of contrast agents to visualize empty spaces, scans to isolate and focus on different planes, etc.

For almost a century, x-ray reigned unchallenged. Nothing less would be expected of such a discovery, so unforeseeable and advanced for the technology that existed at the end of the 19th century. Born before its time, traditional radiology had no choice but to wait.

And it waited until 1972, when Hounsfield, an unknown engineer working in the music recording industry, achieved the first computed axial tomography. With the development of ultrasound, and the appearance, shortly afterwards, of optical fiber, television micro-cameras and nuclear magnetic resonance, one of humanity's old dreams was made real: to see

inside the human body without having to wait for the tragic encounter with Morgagni's table, that is, the autopsy.

All these technological advances caused a real subversion of Medicine. Would it be valid to call this renewed Medicine post-modern? This is a subject that I shall refer to later. But for now, recognizing that almost everything had changed is more important than putting a label on it. It was not just the speed and ease of diagnosis. It was not only the erosion of this sumptuous cathedral, erected stone by stone over centuries, that goes by the name of clinical semiology. More than that: we are entering an era in which the image seems to have gained total control, and it is not easy to assess the impact this will have on learning methods and access to knowledge

Now, what better than a paradigmatic example to help understand the journey that brought us from total ignorance to the magical technology that finally lets us see with extraordinary clarity the structures affected by various pathological situations. For this brief exercise, I chose jaundice.

It is not easy to imagine what primitive man might have thought about someone with jaundice: it was probably limited to the practice of strange exorcisms to ward off the mysterious evil.

In Classic Antiquity, doctors, for lack of anything better, came up with an ingenious theory to explain diseases that they did not understand. According to this theory there were four humors that made up the constitution of the human body: blood, phlegm, yellow bile and black bile. When these humors were mixed in the correct proportions, a person was said to be in a state of eucrasia, perfect health; if, on the other hand, any of them was lacking or present in excess, dyscrasia, or disease, ensued. This meant that in practical terms and in relation to the jaundice, everything remained the same.

By the 16th century, nothing had changed in relation to the ignorance. One only need remember that the disciples of Paracelsus, healing according to their master's doctrine of “similars”, prescribed the administration of a yellow medicine to cure jaundice.

But as anatomic pathologists continued to demystify the organism's innards, it began to become apparent that in most cases, jaundice resulted from an obstruction in the bile ducts. Only the source of the pigment that tinted the skin and mucous membranes such an intense yellow color remained a mystery.

It was Virchow who, for the first time (1847), noted the presence of yellowish crystals in old blood samples and called them haematoidin crystals. Hijmans van den Bergh (1913) found, via his famous experiments, that the substance found in bruises was bilirubin, and Fischer (1923) showed that Virchow's haematoidin and bilirubin was exactly the same thing. All this, and a few experiments on animals, led to the discovery that the precursor of bilirubin is hemoglobin. Where bilirubin was made was still an unknown: in the Kupffer's cells? in the hepatocytes? It is interesting to remember that this heated debate continued into the 1940s.

It was already well known that numerous cases of jaundice occurred during military campaigns or in situations of indiscriminate overcrowding. They were generally benign and so rarely ended up in an autopsy.

In 1865, Virchow had the opportunity to perform an autopsy on a lad with jaundice who had died in an accident. He found inflammatory phenomena in the duodenum, or "catarrhal" that had spread to the bile ducts and seemed to be functioning as actual mucous plugs, preventing the drainage of bile. He speculated that the cause of the jaundice was obstructive, and called this condition "catarrhal jaundice". Only Virchow's enormous prestige can explain why his error in interpretation was accepted for so long. Bear in mind that right up until the 1958 edition of Sheila Sherlock, the chapter on hepatitis still referred to catarrhal jaundice.

Around 1923, Eppinger had already begun to question Virchow's interpretation when he found acute necrotic hepatic lesions in supposed cases of catarrhal jaundice. However, knowledge progressed slowly, mainly because there was a lack of information available about the early stages of the disease. In this climate of relative ignorance, there was still time for Roessle to propose his classification of liver disease into hepatitis, heptoses and cirrhosis, much like what Volhard y Fahr had previously done for the kidneys.

But it was only as a result of the first liver biopsies (Rholm, 1939, Dible and Sherlock, 1943) that it became possible to differentiate jaundice caused by hepatic parenchymal disease from jaundice caused by extrahepatic obstruction.

Forty years ago, when I began my general internship, things were clearer from both physiological and anatomical-pathological perspectives, and jaundice syndrome was an enticing exercise in differential

diagnosis. Masters and disciples broadly discussed all the hypotheses, but because very few resources existed, apart from a few confusing x-rays sometimes enhanced by low-definition contrast, it was difficult to see clearly what was happening. In spite of brilliant reasoning, diagnostic errors were frequent and often it all ended in an exploratory laparotomy.

Frustrations aside, it was a marvelous era, when clinical debates were animated and knowledge, intuition and common sense were put to the proof, or as was commonly said, viewed with a clinical eye. But, it was a period that began to show signs of decline with the arrival of a mass of imaging techniques. Firstly, it was the ultrasound. Then from the 80ties onwards, the hallucinating advance on the most recent technologies that finally permitted us to see directly what clinicians had tried to intuit and guess through complicated reasoning.

Whenever I go to the gastroenterology unit in my hospital where ERCPs are performed, I perceive clearly the transformations that my generation has witnessed. And it is always with a certain amount of emotion that I see Vater's ampulla emerge on the screen, nicely centered and illuminated; the same Vater's ampulla that I knew from illustrations in anatomy texts and that I had chanced upon during autopsies or rare surgical procedures. Now, there it is right in front of me intermittently pumping that celebrated black bile into the duodenum with the same prominence and ease as some television star. Then a delicate probe passes through Oddi's sphincter and with a small squirt of contrast agent, renders the entire biliopancreatic tree clearly visible. A small wonder!!

This begs the question: am I, in this short text, composing the requiem for Internal medicine and suggesting that the traditional techniques of clinical semiology have lost all meaning? Only one who does not know me could think such a thing.

What has happened is that we are at the threshold of a new era that touches all aspects of human activity and that has its genesis in both generally understood phenomena (new technologies, the importance of the media, cybernetics) and others, less well known, that belong to the philosophers' lexicon (the disbelief in metanarratives, the new statutes of knowledge, the nature of social ties, etc.). Let's not beat around the bush: we are in post-modernity with all of its negatives but also all that it represents in terms of progress, innovation and intellectual openness.

It is in this completely new context that Medicine must be rethought and reformulated. It is evident that many of the refinements of clinical semiology and differential diagnosis sit on the shelves of the Museum of the History of Medicine and have lost meaning in the face of new technologies. But even today, there is no substitute for a carefully compiled patient history or a highly detailed collection of objective data that on their own, enable diagnosis with a minimum of resources. Additionally, images as perfect as these sometimes capture moments of a reality that is dynamic and they are not infallible because they are subject to the errors of their interpreters. Deprived of the information, doubts and evolving vision that only clinicians can provide, some of them lose part of their efficacy. It is not surprising that many imaging technicians' reports frequently end with this symptomatic phrase: "to be evaluated in accordance with the clinical condition".

On the other hand, despite the technological advances, Medicine can never dispense with the interpersonal doctor-to-patient relationship, a relationship through which the doctor captures the subtlest psychological nuances, the fears and anxieties, and in which the patient seeks tranquility, balance and hope.

Let us not forget that the wonderful tools which Medicine now offers are the fruit of speculative thinking, and that the amazing images that are now provided to us will serve as a starting point for new ideas and new advances. And that, in spite of his compulsive attraction to the image, man continues to be a rational animal. ■

## References

- Bañuelos M. Manual de Patologia Medica. Tomo III, 5ª Edition. Editorial Científico Medica, Barcelona 1946.
- Eppinger H. Enfermedades del hígado. Editorial Labor, S.A., 1947.
- Frappat B. Le Monde 28<sup>th</sup> June 1992.
- Lyotard J-F. A condição pós-moderna. Gradiva-Publicações, Lda., 2<sup>nd</sup> edition, 1989.
- Sherlock S. Diseases of the liver and biliary system. Blackwell Scientific Publications. Oxford, 2th Edition, 1958.
- Sousa AT. Curso de História da Medicina. Edição Fundação Calouste Gulbenkian, Lisbon, 1981.