

EDITORIAL

Correlating imaging findings with clinical presentation: the boomerang effect for radiologists[☆]



Correlacionar con la clínica: el efecto *boomerang* para el radiólogo

We're living in very interesting times for our specialisation. Times in which I hear with ever increasing frequency that we're being threatened by technology, in particular "artificial intelligence" or AI, as if it were an alien, come to invade us — or worse, already among us on a mission to hold hostage not just radiologists, but all humankind.

The truth is, we humans created AI precisely to do what we don't know how to do, what we can't do and what we know it does faster than us, as it does repetitive tasks automatically, as well as to help find what we don't know. I won't go into detail or get into arguments and counterarguments as to whether we're swapping out carbon atoms for silicon ones, or whether they'll eventually acquire consciousness or free will. Up to now, it's just predictive algorithms. That's all it is. The problem — or the advantage, depending on how we choose to look at it — is that we are highly predictable. We're predictable in our searches, our desires and in how we present ourselves — including when we're ill.

That's just the way we are. This is the basis for radiological signs, for grouping them into syndromes, for giving specific names to diseases. If we zoom in, we see that these ways in which we present ourselves go right down to the level of cells, chromosomes, genes, molecules. That's where things start getting complicated. That's where we need help with searching for abnormalities, integrating, correlating, identifying effects and repercussions, in the context of each patient (personalised medicine), their environment, their circumstances. We need help that we ourselves are developing and ought to use: artificial intelligence, not as a sort of alien, but as a tool.

I perceive no threat in this. On the contrary, I see enormous potential that I'll talk about later on. For now, let's analyse that threat. Let's take a close look at the good

things, the positives, that it's represented for our specialisation. Years ago, I wrote an article in *Diagnostic Imaging* entitled "La Radiología: una especialidad en extinción" [Radiology: a specialisation going extinct]. Back then, the threat was that clinicians (read: cardiologists, gastroenterologists, pulmonologists, neurologists, etc.) would each have their own equipment, act as judge and jury, and render us obsolete, because it would be their business, because they would know more than us about their specialisation, etc. Back then, as now, I said this would not happen, that whether or not this would happen would depend on us, and I set out many actions that we could and should take. Now we know this didn't happen, at least not in the tragic way feared then. Yes, there are trauma surgeons and neurologists who perform magnetic resonance imaging scans. There are gastroenterologists and other physicians doing ultrasounds. Some studies have been "commoditized", to be sure. But I see parallels between this threat and what's happening to taxi drivers with Uber.

If you go to Uber's headquarters, you'll find the slogan "Uber, your personal driver". If we were Uber, our slogan might be "Uber, your personal radiology examination". If we leave it at that, our work could become a *commodity*. Performing a computed tomography scan would be no different from doing a blood test to determine a glycated haemoglobin level, or even a genome analysis like one I can order from *23andMe* by e-mail. I propose that we transform our profession so that our slogan might be not "Your personal radiology examination" but "Your personal radiology specialist".

When we get on a lift, we rarely look at the other people on it. Depending on the situation, we might say good morning or something like that. The doors snap shut, and we all carry on with our thoughts, our problems, our phones. But what if we get stuck on the lift? Pull the alarm! In that moment, we all stop what we're doing. We look round at each other. There's nervous laughter. If this goes on for a bit, somebody starts to panic, somebody tries to calm us down, somebody

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wants to help, etc. Our individual problems fall away in view of our shared dilemma, our problem, the threat facing US.

I believe something similar is happening today with AI, and that's why I see it as something positive. Now's the time to look round at each other. Now we've got a shared problem. Now's the time to reflect on the value we bring and the role we play in patient care. Now's the time to decide whether we want to hide behind radiation (because only radiologists are allowed to have or use radiology equipment), whether we want to remain invisible — or whether we're going to take charge of the situation. Now's the time to decide if we want to keep letting the technology train pass us by, or if we want to be that train's conductors.

That is exactly what I'm proposing. We should be those personal drivers, driving what's happening with medicine and with the patient. Aren't we radiologists those who are best prepared to navigate computational systems like radiology information systems (RIS) and picture archiving and communication systems (PACS)? Who understand spectroscopy, but also fluorodeoxyglucose (18F)? Who can make subjective observations about what's happening with a patient and render them objective through imaging? Today, imaging is not limited to photos. Imaging entails data, biomarkers, a radiological signature. It's personal information on each patient. Now, we'll be able to understand it in the context of the patient's medical history, combine it with genome data, conduct a multifactorial assessment of response to treatment, make a prognosis based on multiple parameters presented to us by the various algorithms we'll use, and ultimately suggest the best form of follow-up.

Let's think about the fundamental importance that we'll have in the next wave of screening medicine, as "screening radiologists". Now a fluid biopsy can reveal circulating tumour cells from a tumour that surely we will only be able to find on imaging. Or "genomic" testing can yield a plethora of results that are difficult to interpret both for patients and for physicians specialising in only one organ or system (apart from geneticists). Somebody has got to be able to see the forest for the trees. Somebody who will have everything displayed on one screen. Somebody whose concerns will not be limited to making measurements, quantifying apparent diffusion coefficients (ADCs) and graphing changes in dynamic contrast-enhanced subtraction (SUB)

and receptor expression. Somebody who, supported by AI, will be able to interpret and make sense of all this information. The radiologist will become a sort of data scientist who will correlate all this information with the patient's clinical condition.

Then there is the last step: telling the story, our story. Wouldn't it be strange to attend a book launch only to find that the author is not in attendance and that the launch is being undertaken by somebody who did not create the book, did not write it, did not even supervise its writing? The same goes for radiology reports. They are our books, our stories, our oeuvres in which we relate what we did, what we know, what we think and what we make of our findings. Do we want to carry on letting somebody else, the reader — not knowing their level of understanding, interpretation or capacity for explanation — be the one to present it to the patient?

We cannot go on like this. We've got to make ourselves visible before our colleagues, but above all before our patients. We've got to be the ones who present their results, our findings. Enough with telling a patient that their doctor will explain their examination to them or discuss it with them. That doctor sent the patient to us not just to have them undergo a radiology examination, but to engage in an interconsultation with a radiologist.

For every action, there is an equal and opposite reaction. We threw the boomerang hoping to rid ourselves of it. That *boomerang* came back. It is in our hands now. Before, we made reference in our reports to clinical correlation. Now, thanks to the ways in which technology and AI are empowering us, we should be the ones responsible for that clinical correlation. Obviously, this represents a major challenge, a great opportunity and a profound responsibility. But let me tell you something. I would not trade these times of transformation of our specialisation for anything. I envy (in a good way) the young radiologists who will live through and lead this transformation. They have my respect, admiration and full support.

Guillermo Elizondo-Riojas
Departamento de Radiología e Imagen, Hospital
Universitario "Dr. José Eleuterio González", Universidad
Autónoma de Nuevo León, Monterrey, NL, Mexico
E-mail address: guillermo.elizondorj@uanl.edu.mx