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Avoiding the trap of causality

All doctors are taught that in science an association doesn't mean causation, yet it is hard to resist our human bias towards cause and effect, writes Jonathan Glass

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In medicine, the timing of an intervention is critical, but once a treatment or procedure is carried out, it is all too easy to fall prey to the illusion of causality. As humans we love to relate an intervention to an outcome and attribute the cause of the latter to the former. Whether it is a substitution by a football manager, a management decision by a chief executive, or a word from a parent, we are all too quick to connect the outcome to the intervention.

A recent experience brought this home to me. I had back pain. It started pretty innocently and developed into the most exquisite pain I have ever experienced. The pain travelled down my left leg and certain actions were guaranteed to produce agony. The most difficult part of my operating day would be putting my left shoe back on after I slipped out of my urological Wellington boots after my list.

After a few months of coming in to work every day and doing the occasional clinic standing up because the pain from getting up and down from a chair was unnecessary, I spoke to an orthopaedic colleague. My MRI scan confirmed my L5/S1 disc pathology, and my colleague and I celebrated that my symptoms and signs tied in exactly with the MR findings, recognising that this is not always the case with this condition.

I discussed possible interventions with my spinal colleague. There was no need for surgery, he informed me, since the outcomes from surgical or conservative management were the same at two years, but if I was really struggling, he thought a local steroid injection performed by a radiologist might settle things down. I carried on working through my pain for the best part of four months. But I remember thinking to myself, while struggling to put my shoe on one day, that if this is it for the foreseeable future, how do I manage my day, living with the pain.

I hadn't considered any treatment, apart from the ibuprofen I was popping fairly regularly, until I arrived home one day and bent down as I opened the front door to pick up the post. This action produced what I can only describe as a beautiful pain, so remarkable it was to become aware that the interplay of nerves, spinal cord, and brain could create such pain. It was visceral—I almost vomited with the pain, yet I almost enjoyed being witness to it in my own body. How did human biology produce such a sensation?

I thought about intervention. I wanted to carry on offering a service to the patients under my care and wondered if a steroid injection as suggested may help facilitate my ability to carry on with my job. But I didn't immediately do it. About 10 days later, while on holiday in Devon, I began to think that the pain was lifting away. Indeed, over the next three weeks the pain slowly eased and then disappeared completely—leaving me with the joy of being able to get in and out of a car without contorting my face.

What was fascinating to me was the timing of the resolution of my symptoms, coming as it did just when I had considered having an injection. Had I had the injection, I would naturally have attributed the resolution of my pain to the steroids. I can imagine that the point I got to, with the pain as severe as it was, is the stage at which many people begin choosing alternative therapies—acupuncture, osteopathy, chiropractic manipulation, and the like—as well as seeking conventional medical interventions. How often, I wondered, do we have these therapies, get better, and attribute the improvement to the manipulation, the acupuncturist, or the injection, when in fact it is simply natural biological resolution? In my case at least, time did seem to be all that was needed to allow me to heal, as Hippocrates said.

Relating cause and effect is fraught with the potential for error when interpreting the outcomes of a large clinical study, and as doctors we are all taught that an association doesn't mean causation. Yet at an individual level, it is often harder to resist our human bias towards cause and effect, and the temptation to attribute a desired outcome to our intervention even when an alternative path may have produced an equally good or even a better outcome. In my case, for example, I didn't have a needle poked in my back, I didn't make a colleague worry overly because they were treating a senior colleague, and I didn't put the NHS through the expense of fluoroscopy.

When a patient makes a startling recovery or has an improvement in symptoms, being a firsthand witness to their experience is powerful. It's comforting as clinicians to think that because we recommended a certain course of action, a patient's improvement is the entirely predictable result and that the desired result won't be achieved without the proposed intervention. Yet within this comfort is also the danger of hubris: assuming that if things go well, it was all our doing. It could mean we miss other important details in that patient's case which affect their future treatment, or that we mistakenly apply the same schema to future patients.

Of course, as doctors we prescribe, treat, operate, and provide care in ways that help people to heal every day, but we must always be careful of falling into the trap of falsely attributing causality.

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