[Diagnosis]

Rethinking pain

Pain is the one problem every doctor is presented with, but what is it exactly? One specialist says current definitions are inadequate – inaccurate, even – and proposes a new 'unifying law of pain'. **Markus MacGill** reports

Consider this for a universal theory of pain: the origin of all pain is inflammation and the inflammatory response. It comes from Dr Sota Omoigui, a pain specialist in Los Angeles and author of *The Anesthesia Drugs Handbook*. Rather than just mentioning inflammation as a component of the peripheral pain mechanism, as many theories do, he puts it centre-stage.

The International Association for the Study of Pain (IASP) defines pain as: 'An unpleasant sensory or emotional experience associated with actual or potential tissue damage.' But Dr Omoigui says this orthodoxy is 'plain wrong' in putting the emphasis on visible tissue damage. 'The IASP definition of pain is just a descriptive definition. It does not address the mechanism of pain,' he says.

Relying on a structural understanding of pain, he adds, has everyday adverse clinical consequences. 'Physicians are comfortable treating what they see. Patients who have structural abnormalities such as an osteoarthritis or herniated disc on MRI scans get operated upon oftentimes needlessly and end up with more joint, back or neck pain.' And, he says, those patients with severe pain but nothing on MRI get referred to psychiatrists.

Different picture

But new technology may help doctors see a different picture. 'Biochemical mediators that are released by stress or in diseases such as fibromyalgia cannot be imaged by the current imaging technology. New technology on the horizon such as MR spectroscopy will do this.'

Dr Omoigui is on a crusade to educate doctors 'that the origin of pain lies in complex inflammatory mediators such as cytokines, growth factors, neuropeptides and neurotransmitters. It is all one continuum of inflammation that underlies the pain pathway from the peripheral tissue to the spinal cord to the brain'.

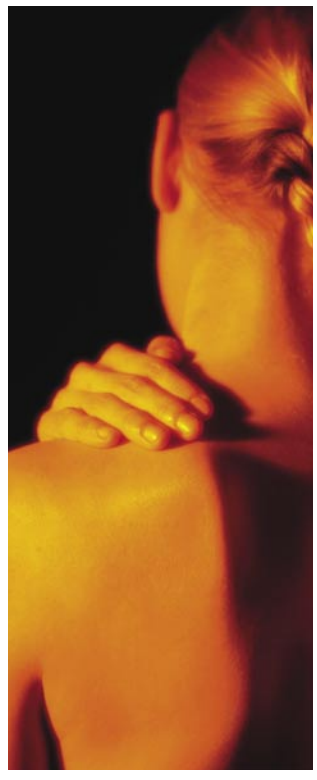
He adds: 'When one talks of inflammation, most physicians (other than rheumatologists) know only about prostaglandins, steroids and NSAID medications such as ibuprofen and aspirin.'

Catch-all definition

The new all-encompassing approach will, as opposed to finding different explanations for different kinds of pain, put inflammation at the centre of them all, so that the origin – 'inflammation and the inflammatory response' – is the same whether the pain is nociceptive or neuropathic, acute or chronic, and whether it is peripheral or central. The theory claims to have answers for the types of pain that Dr Omoigui says have hitherto been 'unfortunately' classified as psychogenic or due to maladaptive thought processes.

Dr Omoigui is not modest and regards his theory as 'a breakthrough'. But he says it is based on existing evidence. He explains. 'For example, the breakthrough in the treatment of migraine came after the drug companies moved from treating the inflammatory vasodilation, which was just a symptom, to using drugs like Imitrex (sumatriptan) which inhibit the release of neurotransmitters from the trigeminal nerve. The therapeutic effects of the antiseizure drugs we use today for neuropathic pain – gabapentin, pregabalin – are due to the inhibition of neuronal firing, leading to the inhibition of release of inflammatory neuropeptides such as CGRP, bradykinin, substance P.'

> "The origin of pain lies in complex inflammatory mediators"
>
> Dr Sota Omoigui



There is more explanation of the complex involvement of inflammatory mediators in Dr Omoigui's paper recently published in the journal *Medical Hypotheses* (2007; 69: 70-82). This takes the simple description of pain signals transmitted up from local pain receptors and nerve terminals, and litters it at every step right up to the central nervous system with descriptions of the complicated effects of inflammation. 'The inflammatory mediators interact in a complex way to induce, enhance and propagate pain. There are also natural anti-inflammatory mediators produced by the body to simmer down inflammation and the inflammatory response,' it says.

Dr Omoigui's detailed breakdown of the involvement of inflammatory mediators is a stark contrast to the relative simplicity of considering pain as a result of tissue damage. His arguments to build up a comprehensive picture of inflammation are complex. The arguments that prove the 'fallacy' of seeing pain visually are more straightforward and reliant on trial data rather than detailed immunophysiology. To this end, he cites a number of studies to show spinal MRI scanning is poor at explaining back pain (see box).

If Dr Omoigui is right to believe a change in thinking is needed for better pain treatment, perhaps the first step is to rewrite the definition of pain. ■

Pain is not always visible

■ Dr Omoigui says the results of one study demand reconsideration of a pathomorphology-based explanation of low-back pain and sciatica. It tracked the natural history of asymptomatic disc abnormalities using MRI and concluded that physical job characteristics and psychological aspects of work were more powerful than MRI in predicting incapacity.
Spine 2000; 25: 1484-92

■ Independent neuroradiologists read the MRI scans of 98 people who were asymptomatic of back pain, and 27 scans were randomly mixed in from people who did suffer back pain. The neuroradiologists were unaware which was which and were given no other clinical data. Looking at five intervertebral discs in the lumbosacral spine, 52% of the asymptomatic subjects had a bulge, 27% had a protrusion and 1% an extrusion.
NEJM 1994; 331: 69-73

■ Another paper also looked at MRI scans on people who had never had low-back pain, sciatica or neurogenic claudication. Again, the independent neuroradiologists were blinded. Finding abnormalities among the 67 asymptomatic subjects brought the authors to conclude that MRI findings must be strictly correlated with age and clinical signs and symptoms before surgery is considered.
J Bone Joint Surg Am 1990; 72: 403-8

■ One study found that arthroscopic surgery for osteoarthritis of the knee had no effect on pain. Some 180 patients were randomly assigned to arthroscopic debridement, arthroscopic larvage or placebo surgery. Pain scores were similar across the groups over 24 months of follow-up.
NEJM 2002; 347: 81-8

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Date of preparation: May 2007