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## The Diagnostic Value of Pain

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### Abstract

Based on an Address delivered to the Royal Medical Society on Friday, 12th January 1960.

Pain is usually the main lead, and often the only clue to diagnosis. For example angina of effort may be associated with a normal ECG at rest, while an ECG may frequently show evidence of myocardial ischaemia in patients who do not suffer from angina pectoris. The clinical history and the response to a controlled clinical trial may make the diagnosis certain, yet mistakes will be made, patients lives altered and their outlook upon the future warped, unless a careful analysis of the various aspects of pain is the rule. This analysis must be made exactly and without the bias of preconceived ideas.

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# THE DIAGNOSTIC VALUE OF PAIN

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On a ward round conducted conjointly by Sir Arthur Hurst and Professor John Ryle a history of a patient with biliary colic was read out. Dr Ryle remarked to the students that this was the typical *continuous* pain of biliary colic. He went on to say what a pity it was that it could not be called "biliary crisis" because the word "crisis" was already applied to various tabetic manifestations such as the gastric crisis. Sir Arthur pricked up his ears and immediately stated that throughout his experience of cases of gall bladder disease, he had managed to read into the history of his patients the intermittent pain which to most people the word colic suggests. Numerous medical practitioners both in London, Edinburgh and elsewhere, teachers or not, have been under the same misconception as Sir Arthur Hurst. It must be said, however, that they too have readily though perhaps not so rapidly, altered their opinions.

Just as a comprehensive physical examination must adhere to a routine, so should the taking of the history of pain follow a systematic analysis in order to avoid omissions. An excellent system was presented by Ryle in his book *Natural History of Disease*, and it is upon this that this article is based.

## (a) Spatial Features

**Site.** A note of the main *site* of pain should include whether it is localised or diffuse. It is often seen that the patient with a peptic ulcer will locate the pain with the tips of three fingers or the tip of the middle finger of the right hand. Pain from the liver which occurs in some cases of acute hepatitis is usually more diffuse in the epigastrium and indicated by the flat of the hand.

The site of pain immediately narrows down the possibilities. Thus a midline epigastric pain without radiation may arise from the stomach or duodenum, and from the structures developed from the duodenum in the embryo, viz. the liver, gall bladder, biliary tract and pancreas. Some clinicians would include instances of ischaemic heart pain; however such

cases never seem to be clear cut. Maybe such cases attend surgeons; and it must always be borne in mind that unless pain is present at the time of examination the patient's observation or recollection may be at fault. It is true that disorders of the structures mentioned above do not necessarily produce pain in the epigastrium at all, and it is not rare for gallstones, gastric or duodenal ulcers to give pain solely in one side of the back. Then the differential diagnosis begins to include disease of the pleura, chest wall and nerves. That is why the other aspects of pain to be discussed later are so important.

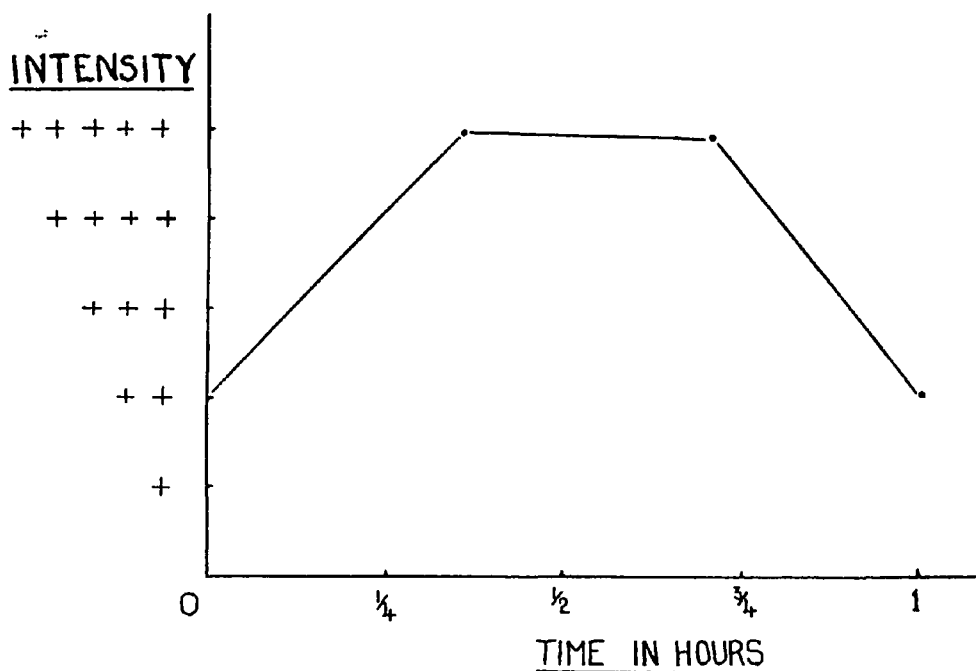
**Radiation.** Radiation is at once a considerable help, but some inexplicable clinical facts must be borne in mind. Thus radiation to the lower jaw is common in heart pain but is not diagnostic. Two cases which were initially referred to the National Heart Hospital give examples of erroneous diagnosis on this account. One was a man in his sixties with a gastric ulcer, and the other a young girl with a duodenal ulcer, who had such slight epigastric pain that she had not mentioned it because of the much more severe pain in the jaw. Similarly pain in the chest radiating down the left arm can sometimes be caused by hiatus hernia, arthritis of the neck, left sided pleurisy and no doubt other disorders as well as heart pain. Perplexing cases may also arise when the pain of radiation is felt without the primary pain if one may call it so; examples include pain in the left arm alone, occurring in angina of effort; two patients with a gastric ulcer, one complained of pain in the left side of the back alone and the other of a substernal crushing pain. Both these patients had been misdiagnosed for some years and had been treated psychiatrically for the pain; subsequently both were relieved permanently after partial gastrectomy.

Perhaps radiation is a deceptive word; the clinical facts may be more intelligible if the pain reference is considered more in terms of mal-localisation. If the skin of a subject is pricked with a pin, the pain can be localised by the finger tips, with varying accuracy over different areas of the body surface. For example localisation on normally exposed surfaces is perfect whereas on the trunk the point indicated may be several centimetres in error. Thus it can be seen that the ability to localise pain is increased with constant practice. If 6% sterile saline is injected deep into the erector spinae at about the level of T9, acute pain will be felt in the back at once which cannot be accurately localised. Within seconds pain will also be felt in the front of the abdomen, somewhere in the region of the ipsilateral rectus abdominis, soon accompanied by muscular rigidity and localised tenderness in this region. Clinically such signs would indicate disease of some underlying viscus. In the light of this experiment it can be seen that disorders of the structures of the body wall may simulate visceral disease as well as vice versa. Pain resulting from visceral disease is also localised quite well in structures from which some sensations are normally received, such as the oesophagus, rectum and bladder. Awareness of any other thoracic or abdominal organs is liminal if at all present. When pain arises in these structures, mal-localisation tends to occur in the extreme forms.

#### (b) Quality and Quantity

**Character.** Pain, according to Sir Thomas Lewis, can have one of two qualities. All skin pains have a pricking quality, all deep pain has a dull sensation likened to that produced by pinching the web of the fingers. This is certainly true for skin pain studied under special conditions, but untrue clinically. It is usual to be able to distinguish pain from a pin prick from

that produced by a burn. Experimentally Lewis produced burning by a fine hot wire passed down the centre of a thick brass cylinder which conducted away all surrounding heat. Clinically, most objects that cause a burn cover a wider area than a pin point. Then heat is appreciated by the surrounding unburnt tissue, and thus recognised as a burn. Similarly deep pains may have a distinct quality which is useful in diagnosis. Thus heart pain felt retrosternally has a gripping, tight, crushing or heavy quality. Such adjectives are never used for the pain of peptic ulcer felt in the epigastrium, which is usually described as gnawing or aching. Heart pains felt in the common areas of reference such as the arm are very seldom



The typical "shape" of the pain of biliary colic.

described in the terms mentioned above. Patients commonly just say pain, aching pain or pins and needles or even numbness. Moreover, it is important to recognise that pains referred retrosternally which arise in structures other than the heart also have a gripping quality. Lack of appreciation of this point sometimes results in a failure to recognise a diagnosis of high gastric ulcer. For example a patient with a normal ECG was referred to a psychiatrist and discharged from the R.A.F. After suffering on and off for a further eight years, the correct diagnosis was made and was effectively relieved by operation. Pain in other parts of the chest do not have the characteristic retrosternal quality even if the source of pain is the heart.

**Severity.** Abdominal pains of great severity are most commonly due to biliary or renal colic, perforated peptic ulcer and acute pancreatitis. One problem is how to assess severity. A male patient was found on his bed on all fours groaning in apparent agony. He was asked to lie on his back so that his belly could be examined. He complied at once, had a pain free expression, no pallor, sweating or vomiting and a normal pulse rate. It was concluded that there were psychological reasons for his overreaction to pain. By watching the behaviour and appearance of a patient it is usually possible

to judge the actual severity of the pain. Relief by a placebo is not satisfactory evidence that the pain was not severe.

If an assessment must be made in retrospect, a detailed account of the patient's behaviour and appearance may be satisfactory. For example if a woman wakes in the night with severe epigastric pain, rises and paces the floor, tries different positions, goes to the kitchen and takes baking soda, applies a hot water bottle, takes whisky, vomits and sweats, then the pain was severe. If, on the other hand, a woman says she had severe pain at work, yet she continued till the usual time, went home in a normal way and tried no method of relieving it, then for diagnostic purposes the pain cannot be rated as severe.

**Shape.** Shape here is used to describe the form of a graph depicting the course of an attack of pain, the vertical axis being the intensity and the *abscissa* the duration of the pain. This will entail details of mode of onset, whether it then stayed constant, grew worse or better, duration of peak, partial or complete remission and mode of cessation.

### (c) Temporal Features

**Duration.** The duration of pain due to various diseases tends to lie within fairly well defined limits. Thus renal biliary colics generally last for a quarter to one hour but may continue for several hours. Peptic ulcer pain lasts for a quarter to two hours, cut short by treatment, but very rarely continuing longer unless perforation takes place. Lightning pains localised in the legs in *tabes dorsalis* are so brief that by the time the patient manages to yell the pain is over.

**Frequency and special times of occurrence.** The pains of peptic ulcer usually occur more than once in 24 hours and on several successive days. Whether or not the pains occur at special times is best assessed by asking the patient. Is he likely to have pain before rising, in the afternoon, evening or night? A rhythm is probable in peptic ulcer, while gallstones, for example, could give pain more than once in a day, though at no special time and intervals between pains may be days, weeks, months or years.

**Periodicity.** Periodicity is particularly a characteristic of peptic ulcer pains. Not infrequently patients insist that the pains have been present for some years, but on suitable enquiry, attacks of days or weeks duration may be found to alternate with periods of freedom for weeks or months. Periodicity is probably one of the most constant and reliable features in the diagnosis of peptic ulcer.

### (d) Features which have a bearing on the determining cause

**Aggravating factors.** Factors causing aggravation are well illustrated by angina pectoris. Here effort is the principle cause. Not always the same effort is required however. That may be because so many other factors affect heart rate and work. Other factors are a cold wind, anxiety, the effect of a big meal and smoking.

**Relieving factors.** Many of these are obvious such as rest in intermittent claudication; alkalis, or vomiting in peptic ulcers. There must be one word of caution; patients often say something relieves them but this by itself is insufficient evidence. For example, patients suffering from angina pectoris of effort are often told to suck a tablet of trinitrin and they will claim great relief. They stop, rest and suck a tablet and the pain goes in two minutes. On enquiring into their disability before treatment they often state that they stopped and rested and the pain went in two minutes. The relief of pain

of peptic ulcer by alkalis is a particularly useful guide. If the patient says that relief is immediate or takes place after an hour peptic ulcer can be excluded as a cause of the pain. It is remarkable how patients suffering from the pain of peptic ulcer find relief in "ten minutes," sometimes "five minutes" or "a quarter of an hour" but rarely "half an hour." It is not appropriate to go into the reasons for this now.

**Associated phenomena.** Ryle gives this last place in his list of observations to be made, he also finds it the least valuable. However, the heading may give a reminder for an enquiry for melaena, family history in relation to peptic ulcer, abdominal colic and so on.

### Conclusion

Knowledge and experience accumulate gradually; obvious conclusions should not be jumped to without taking into account any other symptoms. To take a final example of pain in the left side of the chest on breathing; the obvious conclusion is that the patient has pleurisy. However, many cases do, in fact, occur where this is not the right diagnosis: delayed pain from a fractured rib, zoster, splenic infarct, myocardial infarct have all been known to give the same symptom.

A lifelong study of pain will benefit both a doctor and his patients and increase his interest more and more as time goes on. What might at first appear to be a completely dull history of peptic ulceration can assume greater interest by a careful study of all the individual variations in such cases. Also as a consequence of all this study the doctor will find himself in a far better position to reach the correct diagnosis when a more difficult case comes his way.

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