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INTRODUCTION

Pain is a phenomenon with which we are all familiar. It is a part of everyday life and is a feature of various diseases. It most commonly accompanies an injury, where it serves its most important purpose, namely, to protect us, alert us, and to make us remove ourselves from danger. The severity of pain, and its impact on an individual, ranges from a trivial occurrence such as a needle-prick injury to a sensation of such intensity that it induces thoughts of suicide.

Pain is common. In a review of GP practice notes over 45% of patients had a painful condition listed. According to another UK study, pain leads to 12 million GP consultations a year, 900 000 hospital bed days and 119 million days of certified incapacity annually, amounting to an approximate annual cost of £6 billion. It is obvious that pain has enormous impact, not just on individuals, but also on society as a whole.

DEFINITION

Is it possible to define pain? The International Association for the Study of Pain proposed the following definition (1979): ‘Pain is an unpleasant sensory and emotional experience associated with actual or potential tissue damage or described in terms of damage’. It follows from this that pain is always a subjective sensation and is always unpleasant. This definition has two important implications: pain is not necessarily or always associated with ongoing tissue damage; it is a subjective experience and has an emotional as well as a sensory component.

Pain is notoriously difficult to describe. It is difficult to assess and even harder to quantify. None the less, pain assessment is crucial in order to evaluate its impact on the sufferer and plan a treatment strategy.

CLASSIFICATION OF PAIN

There are many ways in which pain can be classified in order to formulate an optimal treatment strategy. Despite this, classifying a particular pain state can be challenging because often the pain syndrome does not fall into a single category. The main reason for this is that the aetiology and pathogenesis of many pain syndromes is multifactorial.

Pain is commonly classified according to:

- Aetiology and mechanism
- Duration

AETIOLOGY AND PATHOGENESIS

- **Physiological –** an acute response to an injury.
- **Inflammatory/Nociceptive –** pain generated and maintained by inflammatory mediators secondary to an ongoing disease process such as canc
- **Neuropathic –** pain arising from injury or dysfunction of the central or peripheral nervous system.
- **Psychosomatic –** Purely psychosomatic pain is rare. However pain, especially chronic pain, almost invariably has a emotional and behavioural component.

DURATION

- **Acute –** most commonly a physiological response to an injury. It resolves with the disappearance of a noxious stimulus or within the time frame of a normal healing

process.

- **Chronic –** it can either be associated with an ongoing pathological process, such as rheumatoid arthritis or malignancy, or be present for longer than is consistent with a normal healing time. Pain is arbitrarily described as chronic if it persists for longer than 3 months. Chronic pain is often associated with disability and a significant behavioural response. It is sometimes sub-divided into pain associated with cancer and pain associated with non-malignant conditions.

MECHANISMS OF PAIN

At its simplest pain is generated by a noxious stimulus that excites the central nervous system. This mechanism was first proposed by Descartes in the 16th Century and conceptually still holds true, but it is crucial to appreciate that the final subjective experience of pain is shaped by various factors (Fig. 24.1).

A stimulus (which can be thermal, pressure, cold or chemical) excites nociceptors and is then transmitted to the spinal cord by two different classes of nerve fibre. Faster, myelinated Aδ fibres and smaller, slower, unmyelinated C fibres transmit the sensation to the dorsal horn of the spinal cord, where these primary afferents synapse in lamina I, lamina II (substantia gelatinosa), lamina IV, and some in lamina V All these afferent sensory fibres are excitatory. Second-order fibres are then carried in the spinothalamic and spinoreticular tracts to the thalamus, where they synapse. From the thalamus, third-order neurons project to the somatosensory cortex, anterior cingulate gyrus and the insular cortex, where they terminate. It is at this cortical level that a stimulus is perceived as pain.

However we now know that the noxious sensory input may be modulated at several levels by the

nervous sytem thus altering the final pain experience. modulated at spinal cord level by several different mechanisms, as well as by modulation in higher centres in the brain. At spinal level the *gate theory* proposed by Melzack and Wall in 1965 states that non-noxious stimulation of the large Aβ fibres inhibit the response to painful stimuli of neurons with wide dynamic range (WDR neurons, located primarily in lamina V), reducing the input of small fibres mediating the sensation of pain. A good example of this effect is 'rubbing it better'. In addition descending input from higher centres also modulate neural activity in the spinal cord, reducing or enhancing pain sensation. Such descending input is one of the mechanisms by which emotional and cognitive factors modulate pain perception. Much remains to be understood about the central pathophysiology of pain.

In recent years pain management has increasingly adopted a *biopsychosocial model*. This has highlighted the need to take into account the interactions between biological, psychological and social factors leading to an individual's pain experience. (Fig. 24.1)

THE PATIENT IN PAIN

As with any other branch of medicine, careful and meticulous assessment of a patient in pain is important. Two questions should be considered when dealing with a patient in pain:

- Is the pain a symptom of ongoing tissue damage, or of another condition that needs to be dealt with by another medical professional?
- What is the optimal treatment strategy: to either abolish the pain altogether or reduce it to a more bearable level?

Unfortunately, no single standardized approach will allow assessment of pain in every situation. Pain is essentially a subjective experience. Therefore, what the patient describes as their

experience is of paramount importance. As in most areas of medicine the history is the most useful tool in assessment and diagnosis.

History

Taking a history from a patient in pain is more complex than recording symptoms and making a diagnosis. Even in acute pain states, where pain represents a protective function and is a symptom of an injury, taking the patient as a whole and bearing in mind emotional, cognitive and behavioural aspects is crucial in arriving at a treatment strategy.

The Pain. The first step is to evaluate the pain and try to understand its mechanisms.

- **The site of pain –** this may give a clue to the underlying pathology.
- **Distribution –** pain may follow a dermatomal or peripheral nerve distribution, or have no relation to anatomical patterns.
- **Character of pain –** nociceptive (somatic or visceral) versus neuropathic (Table 24.1).
- **Duration of pain –** this may have a bearing on the level of disability and psychosocial cost of the pain.
- **Rapidity of onset and any precipitating factors –** a rapid or relatively recent-onset pain syndrome is more likely to follow a conventional medical model, whereby it is appropriate to search for an underlying cause. Chronic pain requires a more biopsychosocial approach.
- **Severity of pain and its change over time –** this requires some method for measuring pain (see below).
- **Alleviating and exacerbating/aggravating factors –** these may lead to a better understanding of mechanisms that sustain the pain.
- **Exclusion of more sinister pathology –** 'red flags'. Two most important conditions are

not to be missed. One is pain related to cancer and the other is pain related to inflammation.

- **Evaluation of psychosocial elements –** 'yellow flags'. These are not life-threatening symptoms, but their presence means that the psychosocial history has special relevance.
- Previous and current treatment and their effect.

Past medical history – Taking the full medical history must not be overlooked. It may give invaluable clues as to the aetiology and genesis of pain.

Impact of pain – consider the effect of pain on the patient's activity, work, mood, sleep, relationships etc.

Psychosocial history The psychosocial assessment of pain should be directed at finding out the psychological setting of the pain, particularly mood. It should explore the patient's beliefs and expectations. Generally speaking this is more relevant in chronic pain states, because acute pain usually resolves quickly.

EXAMINATION

The purpose of examination is as follows:

- To elucidate and evaluate any physical signs associated with a particular pain condition
- To reassure the patient that pain does not imply any ongoing damage
- To define baseline parameters and monitor their change over time.
- To understand the mechanisms that sustain the pain in particular to identify neurpathic elements.

Detailed examination will focus on different systems according to a particular pain condition. It may involve basic orthopaedic, neurological or surgical examination. Regardless of

the approach, it should follow conventional basic methods: *inspection, palpation*, and *range of movement* where appropriate. For example, a patient who presents with back pain will require at least *inspection* to check for muscle spasm, posture and deformity, and evidence of previous surgery; *palpation* of paravertebral and bony areas; *range of movement* to evaluate any restriction. The examination will also need to include a neurological examination focusing on the signs of nerve root irritation, muscle power, sensation and reflexes.

INVESTIGATION

Investigation of a patient in pain is individually structured. It serves three important goals:

- To exclude more sinister pathology
- To provide diagnostic clues
- To arrive at an optimal management strategy.

The commonest investigation employed by pain specialists is imaging, e.g. using simple X-rays to exclude a pathological fracture, MRI to demonstrate changes within the central nervous system, or an ultrasound examination of the abdomen. Neurophysiological (EMG) studies are helpful to determine the presence and extent of any nerve damage, and various blood tests may be used to determine, for example, the activity of rheumatoid arthritis. Any test used must be considered only as a part of a more global approach, never in isolation.

At the end of the assessment pathology that needs to be dealt with urgently or electively by another medical professional should be identified. These may be the so-called ‘red flags’.

Difficult cases

As the history is the key to pain assessment and treatment it is clear that communication is

paramount. Difficult cases are those where this is difficult. This includes non-English speakers, young children and patients with learning difficulties, confusion or dementia.

MEASURING PAIN

Pain is a subjective experience and therefore difficult to quantify. However being able to quantify pain will aid management by assessing severity, allow the measurement of treatment or intervention effect and is crucial in research looking at new treatment modalities. Measurement tools may be *single* or *multidimensional.*The latter being more useful in chronic pain conditions.

SINGLE-DIMENSIONAL SCALES

These are very commonly used particularly in acute pain. They are simple, sensitive, reproducible and quickly applied, and give a numerical value to the pain severity. They can be either *analogue* or *discrete*. The latter may be numerical or verbal. The most common of these scales is the Visual Analogue Scale (VAS). The patient is given a horizontal line 10 cm long with 'no pain' on the left-hand side and 'worst possible pain' on the right, and is asked to mark the line according to the severity of the pain.

The numerical scale is similar to the VAS. The patient is asked to assign a number from 0 to 10 to their pain, 0 being no pain at all and 10 being the worst imaginable pain. In the verbal rating scale the patient rates their pain into one of the following categories: none, mild, moderate or severe.

MULTIDIMENSIONAL (COMPLEX) SCALES

The development of multidimensional scales acknowledges the multidimensional impact of pain

on a sufferer's life. The commonest scale in use is the *McGill Questionnaire*. There are two forms of this: the original McGill Questionnaire assesses various aspects of pain, including sensory qualities of pain, affective qualities (tension, fear etc.), and evaluative words that describe the subjective intensity of the total pain experienced. There are various measurements derived from the data, but a short-form of the McGill Questionnaire is most used (Fig. 24.2). It is easy to apply and reproducible.

To build up a complete assessment of a patient with longstanding disabling pain a battery of measurement tools may be required which may include depression measurement scales etc

TREATMENT STRATEGIES

Acute Pain

Acute pain management should be directed to the treatment of the underlying cause. For example fractures should be reduced and immobilized and infections treated with antibiotics. Pain is then treated symptomatically with analgesic drugs.

Chronic Pain

In chronic pain the emphasis shifts to management of the pain which includes addressing its psychosocial sequalae. This often involves a multimodal treatment approach.

Treatment Options

Pharmacology

Pharmacological options include simple analgesics, non-steroidal anti-inflammatory drugs, opioids and non-conventional analgesics. These are prescribed according to the WHO Analgesic Ladder (Fig 3). This is generally effective in acute pain and in most cases of cancer pain.

However in chronic pain drugs are less effective and there is often a neuropathic component. For neuropathic pain the most commonly used drugs are antidepressants and anticonvulsants.

Non-pharmacological options

The non-pharmacological management of chronic pain is multi-disciplinary and is usually available through specialised pain clinics. A detailed discussion is beyond the scope of this chapter but pain management may include interventional techniques such as spinal injections, the use of acupuncture and transcutaneous nerve stimulation and also involve physiotherapy, occupational therapy and psychological techniques. The aim is to provide physical and psychological rehabilitation leading where possible to patient self-management.

CONCLUSIONS

Pain is complex and essentially a subjective phenomenon. The patient should always be believed. Pain assessment includes its social and psychological consequences as well as its sensory characteristics. Perhaps more than with any other symptom, management must be individualized to the patient.

Figure 24.1 Biopsychosocial model of pain.

Figure 24.2 Short McGill Questionnaire.

Table 24.1 Nociceptive versus neuropathic pain

	Nociceptive	**Neuropathic**
Description of pain	Aching, localized, toothache-like, sharp, squeezing	Shooting, radiating, stabbing, burning, electric shock-like
Movement impact	Associated with movement	Independent
Physical examination	Normal response	Allodynia, hyperalgesia, vasomotor changes

Examples	Injury, postoperative pain	Peripheral neuropathies, shingles, cancer pain
Treatment strategies	More classic approach, conventional analgesics	More biopsychosocial approach, conventional analgesics ± non-conventional (antidepressants, anticonvulsants etc.)

PSYCHOSOCIAL ASPECTS OF PAIN

Pain is described as having at least five dimensions, each of which should be addressed:

- The *sensation* of pain – the subjective experience
- *Suffering* and *distress* – the emotional component
- *Expectations* and *beliefs* – the cognitive component
- *Verbal* (complaints) or *non-verbal communication* – the behavioural component (illness behaviour) is the way in which a patient responds to and expresses the sensation of pain. It is influenced by various cultural and social factors
- *Impact* of the *social environment*.