13. Management of acute pain in specific scenarios in adults

13.1 Introduction

This chapter describes the *general principles* in the management of *acute pain* using oral and parenteral routes of administration in the *adult population*.

Acute pain is a physical sign and experience that points to real (*existing or potential*) recent *tissue injury*. It results from stimulation of sensory (afferent) nerve endings in areas of tissue injury, whether mechanical (incision, pressure or stretching), chemical, thermal, ischaemia, or other stimulation.

In both threatening injury and real injury, the tissue releases several substances which stimulate *nociceptors* (the respective receptors on the nerve endings). These nerve endings depolarise (are activated) and transport the impulses to the CNS (spinal cord and brain).

Up to this point, the process is called *nociception* (i.e. reception of signals reporting tissue injury), and the pain initiated in this manner is referred to as ***nociceptive pain***. Nociception is processed in the spinal cord and brain and is eventually delivered to the sensory cortex, where it is *interpreted and experienced as 'pain'*. Therefore, pain tells the patient that something is hurting some tissue.

The *types of tissue* that are injured or potentially injured, give rise to different types of acute pain: either *somatic* or *visceral pain*.

Somatic pain originates from nociceptors either in the skin and mucus membranes (*superficial* somatic pain) or from soft tissue, fascia, muscle, joints, tendons and periosteum (*deep* somatic pain). *Superficial somatic pain* is well-localised, intense, sharp, burning, pricking and sharp. This type of pain is experienced with mucosal ulcers, mucositis and burns.

Deep somatic pain arises from SC tissue and the musculoskeletal structures (i.e. muscle, tendons, bones and joints). It is described as being sore, dull or aching. Deep somatic pain is caused by fractures, dislocations, ischaemia, rupture of muscle and ligament sprains. It is less well-localised, depending on the extent of tissue injury (e.g. a toe fracture causes localised pain that resembles superficial pain, whereas a hip fracture causes deep aching pain spreading throughout the upper leg, hip joint and knee).

Visceral pain is frequently accompanied by nausea, vomiting and sweating. While treatment recommendations for visceral pain are the same as for somatic pain, visceral pain processing is distinctly different from somatic nociception and as a result should perhaps be treated differently from somatic pain.

Visceral pain can point to injury of either hollow organs (stomach, intestines, ureter and bladder) or solid organs (or rather their capsulae). Injury is caused by stretching, distension, inflammation and ischaemia.

Visceral pain differs from somatic pain both physiologically and clinically. Since internal organs have a dual nerve supply (sensory autonomic as well as somatic nerve supply) ending in several spinal cord segments, visceral pain is poorly localised, diffused and referred, and is commonly accompanied by signs of activation of autonomic nerves (vagal nerve, sacral nerves and sympathetic nerves). Pain is described as poorly localised, vague, dull, deep, aching, twisting, spasmodic or cramping, or severe discomfort. *Autonomic features* include sweating, nausea, vomiting, hyper- or hypotension, and tachycardia. When visceral pathology (e.g. visceral peritonitis) spreads to structures that are innervated by somatic nerves (e.g. parietal peritoneum), visceral pain displays deep somatic pain, often accompanied by increased tone of abdominal wall muscles.

Owing to the wide innervation of internal organs, visceral pain is not only poorly localised, but also often *radiate*, making pain more unpleasant. Cardiac pain radiates to the arms (usually left), jaws or epigastrium. Blood under the right diaphragm and pathology of the gallbladder radiate to the right shoulder, and pain from a perforated peptic ulcer radiates to the back. Bladder pain radiates to the perineum, while kidney stones cause back pain.

Sometimes, pain is not felt in the area adjacent to the area of injury at all, but is *referred* to distant structures (e.g. cardiac pain may present with only neck or jaw pain and testicular pathology may only present with periumbilical pain).