EDITORIALS A REFLECTION ON POSTOPERATIVE PAIN MANAGEMENT IN CHILDREN.

International Association for the Study of Pain defined pain as an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage.' Postoperative pain usually results from damage to pain receptors (nociceptors) around the surgical wound, and it has proved to be a source of suffering in children, which could have a long lasting negative effect on the child's mind and body. The incidence was noted to be 72% in day case paediatric surgeries in a Nigerian Tertiary Hospital, while a Canadian Tertiary Hospital recorded the incidence of 77% in their In-Hospital admission.2'3

Postoperative pain is a major cause of suffering and discomfort in children.2 Their postoperative analgesics are often discontinued early or the dose reduced because of the belief that children either do not feel pain, or that they feel less pain and fear of drug toxicity. Lonnqvist et al4 showed that structural components necessary to perceive pain are present by the 25th week of foetal life, while the inhibitory pathway develops by mid infancy life.

Pathophysiology of Postoperative Pain

Postoperative pain results from damage to the pain receptors located around the surgical wound and the region of surgical manipulation. The receptors could be associated with myelinated AS fibres which conduct rapid pain and reflex withdrawal, or unmyelinated C fibres that transmit slow pain sensation. The cell bodies of first order neurons are located in the dorsal root ganglia of the spinal cord. The A6 fibres synapse in the dorsal horn with Laminae I and V cells of the spinal cord, whereas the C fibres synapse with the Laminae II and III cells (substantia gelatinosa). In the posterior horn, the second order neurons synapse with As3 nerve fibres, decussate immediately or in a few segments. The fibres ascend with the anterolateral column as spinothalamic tract to the ventroposterior nucleus of the thalamus and periaqueductal grey matter. The substantia gelatinosa contains many interneurons. These are involved in the modification of pain transmission. Fibres also project from the spinal grey matter as spinoreticular tract to the ascending reticular activating system (ARAS) and thereafter reach the hypothalamus and the thalamus, while some bypass the ARAS to reach the thalamus via paleospinothalamic tract. Third order neurons transmit pain to the somatosensory cortex.'

Postoperative pain can affect all the systems of a child. It has the capability of initiating a neuroendocrine reflex involving the stimulation of the sympathetic nervous system and release of plasma catecholamines, cortisol, aldosterone, renin-angiotensin system activation, adrenocorticotrophic hormone, growth hormone, prolactin, endorphins and vasopressin.6 Some of these systemic manifestations are as follows:6

Central nervous system — fear, anxiety, sleep disturbances, restlessness, fatigue.

Cardiovascular system — tachycardia, hypertension, increased cardiac work, increased cardiac oxygen consumption, arrhythmia, increased systemic vascular resistance, increased cardiac output, myocardial ischaemia.

Respiratory system — decreased total lung capacity, hyperventilation, hypoventilation, decreased coughing, enhanced pulmonary complications, reduced functional residual capacity, postoperative respiratory infections.

Digestive system — nausea, vomiting, abdominal discomfort, ileus, delay in the resumption of meals.

Urogenital system — urinary retention, urinary tract infection.

Musculoskeletal system — reduced physical activity, muscular dysfunction, and muscular atrophy.

Haematological system — venous stasis, increased platelet adhesiveness, reduced fibrinolysis, hypercoagulability, deep vein thrombosis, pulmonary embolism.

Metabolic system — fluid retention, sodium retention, increased urinary potassium loss, gluconeogenesis, negative nitrogen balance, fatty acid mobilisation and utilisation and increased plasma glucose.

Endocrine system — reduced plasma level of insulin and vasopressin, increased plasma level cortisol and aldosterone.

Immune system — reduced cellular and humoral activities, lymphopaenia, leucocytosis, reduced reticuloendothelial system activity, reduced neutrophil chemotaxis.

Methods of postoperative pain management in children

Postoperative pain can be managed in different ways in children, and this includes:

Oral analgesics — the oral route can be used to administer medications that can prevent postoperative pain. This is more beneficial in day case surgeries where patients will require to be managed at home. Some of the oral preparations include paracetamol, non-steroidal anti-inflamatory drugs (NSAIDS) like diclofenac, ibuprofen and fentanyl lollipop. NSAIDS have analgesic properties comparable to opioids but without opioid related side effects like nausea, vomiting and respiratory depression.'

Rectal analgesics — analgesics can be applied through the anal route to relieve postoperative pains in children. Some available rectal preparations include paracetamol and diclofenac. It is easy to apply and does not require any special skill."

Parenteral analgesics — parenteral analgesics are given via the intravenous, intramuscular, intraosseous, and subcutaneous routes. Opioids (morphine, fentanyl, pethidine, pentazocine) and non-opioids (parecetamol, Non-steroidal anti-inflammatory drugs) can be given through the parenteral route to manage postoperative pain in children, especially if pain will be managed as in-hospital admission, whereas its utilisation is limited in day case surgeries.

Local wound infiltration - this involves the infiltration of local anaesthetic agent at the surgical wound site, with the aim of preventing postoperative pain. It is easy to apply. Certain local

anaesthetics like bupivacaine and lidocaine have been used with

Peripheral nerve block — this refers to the blocking of certain nerves around the operation site, in other to offer postoperative analgesia. For example ilioinguinal and iliohypogastric nerve blocked to provide analgesia after inguinal herniotomy. Local anaesthetics (lidocaine, bupivacaine) are used. It requires skill to perform. I^o

Topical preparations — drugs can be applied on surgical wounds or skin to prevent postoperative pains. Eutectic mixture of local anaesthetic (EMLA) 5% (mixture of prilocaine 2.5% and lidocaine 2.5%), lidocaine gel at the concentration of **1%**, 2% 4%, 5%, and fentanyl patch can all be applied. They penetrate the skin and provide analgesia of the superficial layers."

Neuraxial analgesia — this method of postoperative pain relief involves the injection of drugs (local anaesthetics, opioids, ketamine) into the epidural or subarachnoid space in other to achieve analgesia. Caudal epidural analgesia is often favoured in inguinal and lower abdominal surgeries. These procedures require skills.^{'o}

Behavioural method — this method of postoperative pain management is designed to involve an age appropriate skills acquired through sensory and procedural training aimed at utilisation of distracting activities. It also involves sucrose lick, skin to skin contact, breastfeeding and comfortable positioning:2

Pain Assessment

Adequate pain management in children will no doubt require accurate assessment of the postoperative pain being managed. This requires creativity and innovation on the part of the assessor

in other to overcome the challenges posed by inability of children to communicate clearly as well as allow them to better understand their treatment protocol, although children above 4 years old can report pain better and assist in their assessment, compared to the younger ones.

Postoperative pain is assessed with a pain scale, and paediatric pain scales in use are categorised into three groups:"

Observational/behavioural pain scale — this includes the premature infant pain scale, neonatal pain scale, body outline, Face Leg Consolability Scale (FLACCS), Children's Hospital of Eastern Ontario pain scales (CHEOPS).

Self-Report pain scale — this includes the visual analogue scale (VAS), numerical rating scale (NRS), Oucher scale (face rating scale or smiley analogue scale), analogue chromatic continuous scale (ACC S) and brief pain inventory.

Physiological pain scale — this includes the patient's comfort, response to analgesia, and response to sedation, heart rate, blood

pressure, respiration, oxygen saturation, palmar sweating, neuroendocrine response.

Postoperative pain management is vital and will require a practical approach, with the aim of preventing pain. A very easy and effective technique is required with adequate assessment of what is being managed, with the target of preventing the morbidity and mortality associated with poor pain management.

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