NEUROLYTIC BLOCKS FOR CANCER PAIN MANAGEMENT

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Pain is among the most common symptom in cancer patients. It is estimated that 4 million cancer patients suffer pain globally and for most of these patients, pain is not satisfactorily relieved. For over a decade, World Health Organization (WHO) has taken a lead in establishing a consensus for a scientifically valid method of relieving cancer pain that is relatively simple, inexpensive and easy to apply at community level, known as the WHO "Three step Analgesic Ladder" method. This approach to drug therapy is however effective in relieving pain in only about 50% of patients treated.

Although developed countries have established government policies on pain, cancer pain and terminal care; India still has no national policy on the care of terminal cancer patients or palliative care. There is an urgent need for fresh initiatives in this direction and we, the Anaesthesiologists should take a lead in formulating a national cancer pain relief programme. Freedom from pain ,suffering and access to palliative care should be seen as a right of every cancer patient.

Relief of cancer pain is possible: the protocols for pain treatment have to be laid down keeping in view the Indian perspective. The key points are simplicity and low cost of the technology used to manage pain and other symptoms. A judicious use of available NSAIDs, Opioids, chemotherapy, radiotherapy and Neurolytic blocks can be adopted to minimise the pain and improve the quality of life of terminally ill patients. Inspite of following the WHO 'analgesic ladder', 40-50% of patients with cancer pain do not achieve a satisfactory balance between relief and side effects using systemic drugs alone without unacceptable drug toxicity. Neurolytic Peripheral and neuraxial blockade may reduce or eliminate the requirement for systemically administered opioids for achieving analgesia. Neurolytic blocks such as coeliac plexus blockade is the preferred method for managing pain caused by neoplastic infiltration of upper abdominal viscera, including pancreas, liver and stomach. This blocks relieves pain by 50 -90% in such patients with relief lasting from 1 to 12 months.Sympathetically maintained pain syndrome in cancer patients is most effectively relieved by interruption of sympathetic outflow e. g. lumbar sympathetic block for pain in lower limbs etc. The role of neuroablative techniques for somatic and neuropathic pain of cancer of often debatable. However chemical neurolysis and pituitary ablations have been reported to relieve diffuse and multifocal pain syndromes.

NEUROLYTIC BLOCKS FOR CANCER PAIN MANAGEMENT

Neurolytic blocks are used as an alternative method for relief of pain in terminal cancer patients in developed countries. These have special advantages in developing countries like India. A typical patient coming from a rural area in poor, illiterate or poorly educated, and unfamiliar with western medicine. He cannot afford to go to urban oncology institutes frequently. Due to a shortage of beds in oncology institutes and hospice complexes, we can admit only a few advanced cancer patients to our hospital wards. Treatment aim, therefore, is to control the symptoms, including pain, as quickly as possible. Patients are encouraged to return to their homes in rural areas after control of pain and symptoms is achieved.

Advantages: The neurolytic blocks have the following advantages in home care by relatives of patients particularly in rural areas of India:

1. Neurolytic blocks provide longer duration of pain relief.
2. Drugs and inexpensive equipment required are readily available. Elaborate equipment is not mandatory.
3. Long-term indoor ward treatment is avoided, repeated visits to the urban pain center are not required.
4. Patient can remain at home pain free even in areas where medical help is scarce.

Disadvantages: The neurolytic blocks are known to have the following disadvantages:

1. The blocks are occasionally unpredictable.
2. Complications like paresis of muscles are known.
3. Blocks are to be repeated after 6-8 weeks.
4. Elaborate equipment like CT-Scan or C-arm x-ray image intensifier is advocated for accurate placement of the needles.
5. Some patients have to be kept in the hospital for 1-2 days to assess the pain relief and to treat the transitory complications.

The basis for the efficacy and utility of nerve block in patients with acute and chronic pain is the interruption of nociceptive input at its very source or the blocking of nociceptive impulses coursing in peripheral nerve fibres. In addition, blockade may interrupt the afferent and efferent limbs of abnormal reflex mechanisms which contribute to the pathophysiology of some pain syndromes. Moreover, since sympathetic fibres destined to somatic structures, particularly the limbs, course through somatic spinal nerves, the blocking of these nerves may be used to eliminate sympathetic hyperactivity responsible for causation of a number of chronic pain syndromes.

In the management of cancer pain, neural blockade are used chiefly for therapeutic purposes; however, occasionally they are also employed as diagnostic and prognostic tools. Some of the

common nerve block procedures and neurolytic drugs used our pain clinic are as described below.

NEUROLYTIC DRUGS

Alcohol is commercially available as a colorless solution that can be injected readily through small bore needles, and is hypobaric with respect to cerebrospinal fluid. Depending on the site of injection and the concentration of alcohol, administration is accompanied by a variable degree of discomfort that, at its extreme, is excruciating but transient. It is generally used undiluted (absolute or 100% alcohol) and if left exposed to the atmosphere, will be diluted by absorbed moisture.50% alcohol is used for celiac plexus blockade Denervation and pain relief sometimes accrue over a few days following injection. I

Various concentrations of phenol prepared with saline, water, glycerine and different radiologic dyes have been advocated. Phenol is relatively insoluble in water and at room temperature, concentrations in excess of 8% cannot be obtained without the addition of glycerine. Phenol mixed in glycerine is hyperbaric with respect to cerebrospinal fluid but is so viscous that, even when warmed, injection is difficult through needles smaller than 20-gauge. Shelf life is exceeds 1 year when preparations are refrigerated and are not exposed to light. Clinically, a biphasic action has been observed, characterized by an initial local anesthetic effect producing subjective warmth and numbness, which gives way to chronic denervation. Less commonly, ammonium sulfate and chlorocresol are utilized to produce neurolysis.

PERIPHERAL BLOCKADE

Peripheral neurolysis has a definite, although limited, role in the management of pain of malignant origin. To ensure effective analgesia, neural interruption is planned proximal to the source of irritation. In technically difficult cases, such as blockade of upper intercostal nerves (where the overlying scapula and muscle increase the risk of a pneumothorax), a more proximal paravertebral or subarachnoid blockade should be elected. Anatomic landmarks tend to be more obvious in the presence of cachexia and weight loss. Because the sensory distribution of peripheral nerves overlaps, blockade of neighboring segments is recommended. Many peripheral nerves are of mixed function. A pretherapeutic prognostic block with local anesthetic is essential to evaluate the impact of concomitant motor deficit. In performing a peripheral neurolytic block, accuracy is essential for good results and to avoid damage to nontargeted structures. This is particularly true in the cervicofacial region, where abundant neural and vascular structures are closely space, and when alcohol or phenol are used because their diffusibility in biologic tissue is less than that of the local anesthetics.Cranial nerves such as Trigeminal and Glassopharyngeal nerves are often blocked by neurolytic drugs in advanced cancers of head and neck.

SUBARACHNOID AND EPIDURAL NEUROLYTIC BLOCK

The advantages of neuroaxial neurolysis are (1) a high proportion of good results in properly selected cases; (2) ease of performance with minimal requirements for equipment; (3) minimal or no requirements for hospitalization; (4) duration of pain relief that is generally adequate for

the preterminal state; (5) ease of repetition when necessary; (6) suitability for aged or debilitated patients; and (7) a low complication rate when proper technique is observed.

Lytic neuroaxial block produces pain relief by chemical rhizotomy. Despite early speculation that phenol was capable of exercising selective blockade of small sensory fibers, 2 pathologic studies have demonstrated that, regardless of size, nervous fibers are affected indiscriminately by both alcohol and phenol. The degree and extent of sensory loss depends on the actual number of fibers destroyed rather than fiber type, which is, in turn, determined by the concentration and quantity of the neurolytic agent.

SUBARACHNOID VS. EPIDURAL NEUROLYSIS

Subarachnoid neurolysis offers the following potential advantages over classic epidural techniques.

1. Return of cerebrospinal fluid verifies subarachnoid needle placement, whereas localization of the epidural space must be inferred from the results of epidurograms and/or test doses of local anesthetic.

2. Subarachnoid neurolysis generally results in more profound analgesia, and, as a consequence, reinjection is required less often. This phenomenon is probably related to increased direct contact between drug and targeted nerve roots.

3. Subarachnoid injection is readily performed on an outpatient basis, or even at the bedside. Recent recommendations that epidural neurolysis be accomplished by repeated administration of phenol through an indwelling catheter mandate inpatient hospitalization.

4. Although reports indicate that gravity and position can be partially relied on to control the effect of epidural block with hyperbaric phenol, these factors can be utilized to exert more precise control in the case of subarachnoid injection.

5. The excessive viscosity of pure phenol-glycerine preparations prevents injection through small caliber tubing. If epidural block is planned with the intention of reapplication through a catheter, then the phenol glycerine mixture must be diluted with water, saline, or dye.

We have achieved good results with classic Meher's technique which consists of performing subarachnoid infiltration with hyperbaric 5% phenol in glycerine at the level of the L5-S1 interspace or higher. Out of 180 patients with perineal pain due to gynecologic malignancy treated with one or more 5% phenol in glycerine blocks, 80% of patients derived satisfactory to excellent results for 4-6 weeks. Using this technique, we have achieved also satisfactory pain relief for 4-6 weeks in 74% of the patients suffering from advanced cancer of the rectum and external genitalia.

SYMPATHETIC NERVE BLOCKS

Local anesthetic infiltration of the sympathetic nervous outflow such as lumbar sympathetic

chain, stellate ganglion, celiac plexus etc can be performed for diagnostic, prognostic, or therapeutic purposes. A diagnostic nerve block helps to establish the relative contribution of the autonomic vs. somatic nervous system to pain transmission. Response to local anesthetic blockade helps to determine whether repeated local anesthetic blocks, a neurolytic block, or radiofrequency is likely to provide prolonged relief. Finally, in carefully selected patients, a therapeutic effect may be obtained by the injection of a neurolytic agent particularly phenol.

Celiac plexus block

Neurolytic celiac plexus block (NCPB) has received widespread attention because of its excellent potential to relieve upper abdominal and referred back pain secondary to malignant neoplasm involving structures derived from the foregut. The most common indication for celiac axis block is pancreatic cancer, which, contrary to traditional teaching, is frequently associated with painful rather than painless jaundice. Also, NCPB is efficacious for pain associated with neoplasms involving the distal esophagus, stomach, liver and bile ducts, small bowel, proximal colon, adrenals, and kidneys. The posterior percutaneous approach, introduced by Kappis and popularized by Moore and others, using two needles (6 in., 20 gauge) is most commonly advocated. There has been renewed interest in utilizing an anterior approach, as radiologists have become more experienced with this route for biopsy and drainage procedures. A transaortic technique that is similar to conventional approaches has been described in which the needle is deliberately passed through the aorta, in a manner resembling the transarterial method of brachial plexus.

Another recent modification, described by Singler, involves deliberate perforation of both diaphragmatic crura under CT guidance to ensure the spread of injectate anterior to the aorta. An underutilized approach is injection under direct vision by the surgeon at the time of laparotomy. At times this may not be possible because diagnosis is made on a nonsurgical basis or because of the presence of diffuse intra-abdominal disease. However a radiolucent clip can be placed in the region of the celiac axis to facilitate postoperative percutaneous localization. Surgeons need to be made aware of the potential of this maneuver for the relief of postoperative suffering.

The location of the celiac axis deep within the retroperitoneum near the vertebral column and in close proximity to major vessels (aorta, vena cava, and their branches) and viscera (kidneys, pleural) provides the potential for complications of devastating proportions. Reported complications include pneumothorax, chylothorax, pleural effusion, convulsions, and paraplegia. Nervertheless, the results of several large series indicate that, given sufficient attention to detail, the incidence of complications should be minimal.

Superior hypogastric plexus block and Presacral neurectomy :

Surgical interruption of the hypogastric plexus (pre-sacral neurectomy) is a well-accepted procedure that has been demonstrated to relieve a variety of painful pelvic conditions, predominantly of pain associated with gynaecological malignancies. Superior hypogastric plexus block, a percutaneous procedure that is analogous to presacral neurectomy, has recently emerged as an important option in the management of intractable pelvic pain of

neoplastic origin.

The superior hypogastric plexus (SHGP), also called the presacral nerve, is a retroperitoneal structure located bilaterally at the level of lower third of the fifth lumbar vertebral body and upper third of the first sacral vertebral body at the sacral promontory and near the bifurcation of the common iliac vessels. The SHGP is in continuity with the celiac plexus and lumbar sympathetic chains above. Via the hypogastric nerves, the SHGP innervates the following pelvic viscera: descending colon and rectum, vaginal fundus and bladder, uterus and ovary. In the first published study, SHGP block was shown to reduce pelvic pain by a mean of 70% in patients with cervical cancer.We routinely practice SHGP neurolytic blockade in patients with advanced uterine,cervical and rectal cancers.It is performed under fluoroscopy and 8% aqueous Phenol is the neurolytic agent of choice.

Ganglion impar block

This procedure was recently proposed for sympathetically mediated pain involving the perineum and genitals, specially of a burning or urgent nature. The ganglion impar is a solitary retroperitoneal structure located at the level of the sacrococcygeal junction that marks the termination of the paired paravertebral sympathetic chains. Good results and an absence of complications have been reported for perineal pain in patients with cancer of the cervix and cancer of endometrium.

CONCLUSION

Cancer pain patients are often physically and emotionally drained. They are often frustrated by inadequacies of other therapeutic options, and arrive with expectations of miracles. Patient selection and education is therefore essential, as there are very real limitations, complications and side effects that these patients must accept prior to the placement of such a block. Such preliminary discussions are also helpful in avoiding legal proceedings by an already litigious population.

Neurolytic nerve blocks offer an excellent option for the physician in the fight to control cancer pain. Their success is mostly dependent upon the individual patient, the patient's under standing and cooperation, and the experience of the physician. With proper training and experience, such blocks can be easily utilized to help provide cancer pain relief.

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