Neural Blockade & CANCER PAIN

by Nalini Sehgal, M.D.

Pain is a major symptom of cancer and occurs at all stages of the disease. Thirty percent of patients with cancer report pain at diagnosis, 20 to 30 percent have treatment-related pain, and 10 to 15 percent have pain unrelated to cancer.[1] In addition, pain is usually a hallmark of progression or metastatic spread, and 65 to 85 percent of people with cancer have pain when they develop advanced disease. In 10 to 20 percent of cancer cases, pain is difficult to treat, frustrating, and poorly controlled.[2]

Currently, opioid pharmacotherapy is the principal weapon in the fight against cancer pain; but when less invasive treatments are unsuccessful, invasive interventions should be added to optimize pain relief.[3]

Interventional pain procedures target neural and non-neural pain generators (i.e., joints, muscles, tendon sheaths, bursae, nerves, ganglia, and plexuses), and neural blockade techniques provide excellent pain relief for neuropathic, sympathetic, nociceptive somatic, or visceral pain. Neural blockade techniques are broadly categorized into non-neurolytic and neurolytic blocks.[4]

Non-neurolytic Blocks

Local anesthetic and corticosteriod blocks are used to treat a variety of pain syndromes. They can also predict how a patient will respond to neurolytic blocks. A good response to non-neurolytic interventions usually means the patient will benefit from neurolytic procedures as well. Fluoroscopic guidance improves the accuracy of these blocks and minimizes complications.

Local anesthetic and corticosteroid injections are used to treat myofascial pain, tendonitis, bursitis, or arthritis resulting from predisposing faulty postures and abnormal joint biomechanics. Somatic, sympathetic, and neuropathic pain respond to local anesthetic injections or the continuous administration of anesthetic drugs through a catheter.[5,6] Intercostal nerve blocks or interpleural analgesia are indicated in post-thoracotomy chest wall pain/intercostal neuralgia, and radiculopathy requires selective nerve root blocks or transforaminal epidural injections when non-invasive treatments fail.

Sympathetic blocks and other regional anesthetic techniques are employed in sympathetically maintained pain states, ischemic pain, postherpetic neuralgia, and radiation plexopathy.

Neurolytic Blocks

Alcohol and phenol are the preferred agents for neurolytic procedures because they cause axonal degeneration within minutes and effectively interrupt the central transmission of pain impulses. Chemical neurolysis can result in immediate and total pain relief in selected patients with localized or regional pain. Opioid requirements decrease sharply, and patients on high doses of opioids will require careful tapering to avoid respiratory depression.

Other indications for neurolysis are costopleural syndrome and sympathetically maintained pain in Pancoast's syndrome.

Unfortunately, potentially unacceptable side effects limit the utility of neurolytic blocks; but neurolytic blocks are still preferred over standard opioid analgesia to control intractable abdominal, pelvic, and perineal pain.

The following four criteria must be met before a nerve block is considered appropriate:[7]

- Limited lifespan of three to six months
- A favorable risk to benefit ratio (i.e., the block will not impair bladder or bowel function or cause limb paralysis)
- A poor response to primary antitumor treatment, which has not been able to reduce the tumor burden
- A good analgesic response and acceptable side effects with prognostic blocks.

Unacceptable side effects are 1) sensorimotor, autonomic, and sphincter dysfunction resulting from the spread of neurolytic agents to adjacent somatic and autonomic nerves, 2) deafferentation pain from the denervation of somatic nerves, and 3) pain recurrence due to nerve regrowth or tumor spread beyond the area innervated by the previously blocked nerves. In general, neurolytic blocks are temporary and provide three to six months of pain relief.

Neurolytic celiac plexus blocks (NCPB) and *splanchnic nerve blocks (SNB)* are routinely performed (and are preferred over standard analgesic therapies) for patients with intractable pain from pancreatic and upper gastrointestinal cancer. NCPBs provide immediate and substantial pain relief in 70 to 90 percent of cases, improve the patient's quality of life, and significantly reduce opioid intake.[8,9] The procedure can be repeated in three to six months if the effect of the initial block wears off.

NCPBs are performed percutaneously or intraoperatively. Under radiologic guidance, 50 to 100 percent alcohol is instilled anterior to the aorta at the level of the L1 vertebral body. Injection site pain, diarrhea, and temporary hypotension are transient adverse effects. A low complication rate is observed, since the risk of the neurolytic agent spreading to the somatic nerves supplying the lower limbs, bladder, and bowel is minimal.

Superior hypogastric plexus blocks (SHPB) are indicated for unrelenting pain from cancer of the pelvic viscera. This plexus lies in front of the L5 and S1 vertebrae in the prevertebral space. A spinal needle is placed percutaneously in this space from the back under radiologic guidance. Excellent analgesia is reported by 70 percent of patients after a SHPB. Reductions in pain scores and opioid consumption are reported to be significant, even in patients with advanced disease.[10] No major complications have been reported following SHPBs, although a potential risk exists for the spread of neurolytic agents to the nerve fibers controlling micturition, bowel motility, and sexual function. The SHPB block can be repeated if pain recurs. Patients who fail two consecutive attempts are candidates for intraspinal opioid analgesia.[11]

Ganglion impar neurolytic blocks relieve perineal pain from cancer of the cervix, endometrium, bladder, and rectum.[12] The ganglion is a single, midline structure ventral to the sacrococcygeal junction and can be accessed by a midline trans-sacral approach.

Painful input from somatic and visceral structures can produce sympathetically maintained pain (SMP) that may be visceral or neuropathic in nature. SMP is transmitted by a pair of paravertebral sympathetic nerve trunks that are easily accessible to blockade.

S*ympathetic ganglion neurolysis* relieves SMP and improves blood flow and is used to treat pain from radiation plexopathy, phantom pain, herpes zoster, vascular insufficiency secondary to malignancy, and complex regional pain syndromes (reflex sympathetic dystrophy and causalgia), with little risk of motor or sensory loss or deafferentation pain.

The trigeminal nerve receives sensory input from the skin of the face, anterior two-thirds of the tongue, and oronasal mucosa. *Anesthetic blockade* or *chemical rhizolysis* of the trigeminal ganglion or its individual branches is indicated in orofacial malignancies with intractable head and face pain. Complications include inadvertent dural puncture, neuritis, and chronic corneal anesthesia.

Neurolytic spinal blockade can produce profound segmental analgesia. Nociceptive input is interrupted by selectively destroying the dorsal roots and rootlets between the spinal cord and the dorsal root ganglia. The procedure is reserved for terminally ill patients with cancer who have a short life expectancy and unilateral somatic pain localized to a few adjacent dermatomes, ideally in the trunk and distant from sphincter or limb innervation. Intraspinal tumors should not be present, and the patient should respond well to prognostic local anesthetic blocks.

Combined with a unilateral cordotomy, *subarachnoid phenol blocks* effectively control pain in costopleural syndrome, which is caused by invasion of the pleural cavity and thoracic wall.[13] Adverse effects include postdural puncture headaches, meningitis (rarely), persistent numbness and paresthesia, loss of motor function due to the unintended neurolysis of ventral rootlets, and sphincter and limb weakness.

Conclusion

Effectively relieving pain in cancer patients requires a range of treatment alternatives, including neural blockade when the patient's pain no longer responds to opioid analgesia. The type of neural block selected is determined by the location and mechanism of the pain, the physical status of the patient, the extent of tumor spread, and the technical skill and experience of the person performing the intervention.

Non-neurolytic blocks can provide safe and effective analgesia for the less serious conditions indicated above. Neurolytic blocks, with their potential for complications, are reserved for select patients who are unresponsive to standard analgesic pharmacotherapy and/or are at a more advanced stage of disease.

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