REGIONAL ANAESHETIC TECHNIQUE FOR DIAGNOSIS AND MANAGEMENT OF CHRONIC PAIN.

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Regional Anaesthetic Technique (Neural blokade) plays a major role in the management of chronic pain, if employed properly. It can be used both for diagnosis. and management of chronic pain. Evaluation of patients with chronic pain involves detailed history, proper clinical examination, relevant investigations to arrive at a provisional diagnosis. Psychological evalution is important and should be performed by a trained pshycologist. The indication of nerve block and its interpretation has to be well understood (Ref 1 & 2).

INDICATION FOR DIAGNOSTIC BLOCK

The aim of diagnostic block is to help in determining or differentiating the site of pain or pathways by which a presumed nociceptive input mediates pain. This can be done either by anatomic or pharmacological approach, to identify specific structures, nerves or process involved in the pain generation. When this information is combined with a detailed physical and psychological workup, it may be possible to provide accurate details as to one or more aspects of patient's pain (Ref. 2).

INDICATIONS FOR DIAGNOSTIC BLOCK

1. Anatomic localisation of pain source.
2. Determine visceral or somatic origin of thoracic and abdominal pain.
3. Differentiate sympathetic from somatic peripheral pain.
4. Diagnosis of refered pain.
5. Establishment of segmental level of pain input
6. To determine the role of pain and muscle spasm or bone ortendon or joint capsule fixed deformity in R.S.D.
7. Diagnosis of sympathetically mediated pain.
8. Diagnosis of central pain.

1. ANATOMICAL LOCALISATION OF PAIN SOURCE :

Injection of local anaesthetic solution into superficial site of pain or tenderness can readily elicit the precise tissue source of pain and offer a definite diagnosis. Examples are nerve entrapments (from trauma, local disease or post-surgical entrapment) (Ref. 5). Trigger points and soft tissue sites of pain can be diagnosed. Ability to direct needles to deep-seated joint structures allows the localisation of pain to tissues within or the joint itself or adjacent structure (Myofascial) mimicking articular pain. Low Backache is a good example that can be diagnosed by such methods. By X-ray control, precise and accurate injection of local anaesthetic it is possible to distinguish pain arising from facet joint, from nerve damage, foraminal stenosis, from ligaments, or soft tissue muscle sites (Ref. 6). Another example is X-ray controlled injection of local anaesthetic and

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contrast mixture to temporomandibular joint. The diagnostic block is helpful in the diagnosis of pain in the region of the jaw (Ref. 7).

2. VISCERAL VERSUS SOMATIC PAIN : (REF. 7)

Pain involving chest, abdomen and pelvis can pose difficulties. In this situation it is better to exclude body wall pain in order to ascribe a visceral source by somatic blocks eg. Intercostal block or by local infiltration of painful site. If no focus can be identified, diagnostic differential epidural block, graded in concentration, with progressive rostral spread can delineate the anatomic level and possible nature of pain input (Ref. 8). In cases where somatic block and visceral block upto T provide no relief the cause may 4 be supra-spinal site.

3. SYMPATHETIC MEDIATED PAIN VERSUS SOMATIC ORIGIN OF PERIPHERAL PAIN :

Sympathetic mediated pain is contributed by sensitisation of peripheral pain receptors resulting in sympathetic over activity. History and physical examination will help in the diagnosis of R.S.D., Raynauds Disease and Vascular insufficiency. Diagnostic sympathetic block can be done at cervico thoracic sympathetic chain, splanchnic nerves, coeliac plexus and lumbar sympathetic chain. Objective efficiency of block, pain relief by V.A.S., thermography, skin temperature and blood flow changes may be documented to know the efficiency of sympathetic block. Intravenous regional sympathetic block by ganglionic blocking agents is an alternate to anatomic sympathetic block for the diagnosis of pain in the limbs. If the results of sympathetic block are favourable series of therapeutic blocks may be performed. Pain caused by somatic factors may be diagnosed. Pain caused by somatic factors may be diagnosed by somatic block eg. Block of lateral cutaneous nerve for the diagnosis of Myalgia Parasthetica, Stump pain by local infiltration.

4. REFERRED VERSUS FOCAL PAIN :

Pain may be referred from viscera to the skin surface, and from deeper somatic structures to other somatic area. For example facet pain referred to back or limbs. Blockade of the joint or the medial branch of the dorsal root of the spinal nerve helps to diagnose facet joint disease. Backache may be due to local soft tissue ligaments or muscle pathology. In such cases, local infiltration to trigger areas may relieve pain.

5. ESTABLISHING SEGMENTAL LEVEL OF NOCICEPTIVE INPUT

Somatic segmental level of nociceptive input are best established by blockade of somatic nerve roots or intercostal nerves, Visceral segmental levels are more precisely determined by blockade of sympathetic ganglion.

6. CENTRAL PAIN :

Central pain can be diffferentiated from peripheral pain by diagnostic epidural opioid block (Ref. 9). This aims in diagnosing pain arising at or peripheral to the dorsal horn which may respond to opioid whereas the central pain will not. (But certain types of peripheral pain like intermittent deep somatic or visceral pain may not respond). The central pain will not respond to opioid by any root (Ref. 2).

TECHNIQUES OF DIAGNOSTIC NERVE BLOCKS

1. Infiltration technique for tender point or trigger point produce rapid and complete relief of pain and muscle spasm. Local infiltration technique include subcutaneous infiltration to determine whether pain is arising superficially as in post-surgical scar entrapment of cutaneous nerves. If infiltration brings about pain relief repeated injections with local anaesthetics and steroids may be attempted. The membrane stabilising action of the steroid extends the period of quiescence in the damaged nerves (Ref. 10). Prolongation of pain relief tends to confirm the diagnosis and offer a therapeutic opinion.
2. Blockade of peripheral nerve (including cranial nerves) and spinal somatic nerve blocks may be useful in knowing the peripheral pain component. Small doses of local anaesthetics should be used for nerve block to reduce the central effect of local anaesthetic. The block may be aided by X-ray, using contrast medium, and peripheral nerve stimulator for better localisation.
3. Diagnostic plexus block may be used to investigate pain and limitation of joint movements associated with RSD. For example in R.S.D., under plexus blokade, pain and muscle spasm are absent. Passive movement of jaoint may reveal the range of movements of joints which can be a good prognostic factor.
4. Differential intrathecal epidural neve blockade. The positive information that can be obtained by above are
   1. The segmental level of nociceptive input may be established.
   2. Persistance of pain in or below the area fully blocked suggests pain of a higher central focus (Ref. 2 &3).

DIAGNOSTIC EPIDURAL OPIOID BLOCKADE

Epidural opioids block nociceptive input at the level of dorsal horn leaving sensory sympathetic and the motor function unchanged. Relief of pain would point to a nociceptive focus either in the dorsal horn or peripheral to the dorsal horn. Failure would point to more central pain (Ref. 2). However there are two problems with this technique:

1. Some types of pain may not be abolished by spinal opioids. For example intermittent, deep somatic and visceral pain (Ref. 12).
2. Opioid drugs migrate in CSF to the brain and may exert effect at the level of the brain. To solve these problems blood and CSF pharmaco - kinetic studies should be carried out after eipdural and intrathecal opioid injection.

SYMPATHETIC CHAIN BLOCKADE:

This represents the most direct method of determining whether pain is sympathetically mediated. The following are techniques:

1. Stellate block
2. Splanchnic block
3. Thoracic Sympathetic Block
4. Coeliac block
5. Lumbar sympathetic Block

For the upper limb stellate block is carried out using 15 ml of 1% lignocaine.

For the lower limb lumbar sympathetic block is carried out by a needle which is inserted at L2 and 10 ml of 05% lignocaine injected. The results may help in determining whether a neurolytic block is helpful. Intrathoracic pain may be diagnosed using thoracic paravertebral or stellate ganglion block. Intra abdominal pain may be diagnosed using splanchinic or coeliac block. Intrapelvic pain may be diagnosed by attempting bilateral lumbar sympathetic block.

REGIONAL BLOCKADE

With local anaesthetic this may be an useful method of determining whether pain arises from the peripheral focus in the upper and lower limbs. Pain relief can be only assessed while the cuff is inflated. Since the generalised effects will be produced as soon as the local anaesthetic is released into the circulation, Intravenous regional sympathetic block may be used as a diagnostic test for S.M.P. The positive response helps to confirm the diagnosis of symapthetic over-activity. The negative result has to be interpreted with caution. Some authors advise the diagnostic intravenous sympathetic blocks should not contain local anaesthetic, since it is important to determine whether the sympathetic block relieves pain (Ref. 13).

INTRAVENOUS INFUSION OF LOCAL ANAESTHETICS:

Intravenous infusion of local anaesthetics can be used for the diagnosis of central pain and also for the treatment. A future application may be the use of intravenous infusion (14 & 15) of local anaesthetic to separate the effect of neural blockade from those of absorbed local anesthetic. For example Blood concentration of local anaesthetics could be measured in each patient during nerve block. On a separate occasion, local anaesthetic would be infused to produce similar blood concentration. The effect on both the procedures is compared. The degree of pain relief with intravenous infusion similar to that of the nerve block suggests a central pain (Ref. 2).

METHODS OF EVALUVATION OF DIAGNOSTIC BLOCK

Neurologic changes consequent tonerve block should always be confirmed. Sensory, Motor loss and deep tendon reflex are used for somatic nerve block. Sympathetic block is confirmed by vasodilatation, loss of sweating, rise of temperature, evidence of horners syndrome for stellate block or postural hypotension and increase gut mobility with visceral block.

TIME COURSE OF RESPONSE (DURATION AND NATURE OF RESPONSE)

If the subjective relief is considerably less than the duration of nerve block, a non specific effect may be inferred. When the blcok duration and analgesia are in parallel, the effect is specific and is caused by local somatic disease. Extended pain relief generally indicates an element of reflex activity-either muscle spasm or sympathetic over activity. After the diagnostic block once the mechanism of pain is confirmed, the therapeutic block can be utilised to relieve the pain on a long term or permanent basis.

BLOCKS FOR PAIN MANAGEMENT

The local anaesthetic nerve blocks are effective in the managemnt of self limiting disease accompanied by severe pain and in breaking up the so called "Vicious Cycle" in the CPS.

NERVE BLOCKS ARE EFFECTIVE IN

a) Neurogenic Pain
- — Trigeminal neuralgia
- — Occipital neuralgia
- — Glossopharyngeal neuralgia
- — Intercostal neuralgia
- — Radiculopathy
- — Peripheral neuralgia and plexalgia
- — Compression and entrapment syndromes
- — Neuroma

b) Musculo - skeletal Pain
- — Myofascial pain
- — Pain from inflammation
- — Pain from sprains and strains
- — Torticollis
- — Skeletal Pain

c) S.M.P. - RSP, Causalgia
- Peripheral Vascular disease

d) Visceral Pain
- Acute myocardial infarction
- Angina pectorsis
- Ureteric and Biliary colic

e) - Miscellaneous Group
- Herpes Zoster and Post herpetic neuralgia
- Post amputation pain
- Pain secondary to paraplegia / quadriplegia

NEURALGESIC PAIN SYNDROMES

In which local anasthetic nerve block may be useful are

a) Neuralgias of cranial and spinal nerves
- Trigeminal neuralgia
- Occipital neuralgia
- Glossopharyngeal neuralgia
- Intercostal neuralgia

b) Radiculopathies of cervical and lumbar nerve roots

c) Cervical, Brachial Lumbosacral Plexalgias

d) Peripheral Neuralgias and neuropathies

e) Compression and entrapment syndromes

TRIGEMINAL NEURALGIA

1) Trigeminal Neuralgia is a manifestation of underlying disorder physiology. It is manifested by the classical features of the unilateral painful paroxysms of lightning pains lasting for few seconds to a couple of minutes (Ref. 2)

2) It may be blocked by mechanical stimuli, such as touching of the face, a breeze blowing across the face. Pain management in trigeminal neuralgia is mainly by medication. Failure of medical line of treatment, or side effects to medicines will be an indication for percutaneous radio frequency, thermocoagulation or surgery.

Indication for local anaesthetic block

1. Diagnostic block
2. To differentiate from a typical fascial pain.
3. It allows the patient to recover from sèvere pain immediately and thereby have a pain free period before a permanent treatment is planned (Ref. 2).

OCCIPITAL: NEURALGIA :

Occipital Neuralgia is caused by compression of anterior and posterior root

of the 2nd cervical nerve. Clinical features consists of pain in the insertion of trapezius and scalene muscles getting radiated along the course of nerves. Persistent occipital dysaesthesia with tenderness over the exist of nerves. series of 3-6 occipital nerve blocks will usually give prolonged relief (Ref. 2).

GLOSSOPHARYNGEAL NEURALGIA :

Pain occuring in the posterior 3rd of the tongue and in tonsillar pharyngeal area. Pain is stabbing with period of excacerbation and remission.

Therapeutic management consists of 5-6 Glossopharyngeal nerve bloocks once in a week.

INTERCOSTAL NEURALGIA :

Herpes Zoster, post-herpetic Neuraligia, Diabetic Intercostal Neuraigia are the most common cause of Intercostal neuralgia. Post thoracotomy nerve entrapment can also produce radiating pain along the intercostal nerves. Intercostal nerve block with local anaesthetics and steroids singly or in combination in series will give good result.

RADICULOPATHY

Acute radicular pain results from irritation and inflammation of nerve roots by herniated disc. The usual sites are lower cervical and lumbar areas. Chronic pain results from chemical radiculitis as a result of degenerating glycoprotein from the herniated disc. Injection of corticosteroids in the epidural space adjacent to irritated neve roots produce pain relief in majority of patients with radicular pain (Ref. 16).

PERIPHERAL NEURALGIA AND PLEXALGIA :

Pain and allodynia may result from many types of peripheral nerve pathology. Cause may be trauma, compression, toxic and metabolic neuropathy (diabetes, Alcoholism, chemotherapy drugs). Herpes zoster may also cause similar nerve destruction with cutaneous rash. Multimodal therapy has to be used. Medical line of treatment with anti-depressants and anti-convulsants are effective. Peripheral or sympathetic block with local anaesthetic and steroid may be helpful.

COMPRESSION AND ENTRAPMENT SYNDROME :

The peripheral nerves of the thoracic and limbs are prone for entrapment and compression. The common entrapment neuropathies are intercostal, lateral femoral cutaneous nerve, carpal tunnel syndromes, delayed ulnar and peroneal palsy. Light touch produces intense pain, sometimes associated with RSD. Peripheral nerve block or sympathetic block with a mixture of local anaesthetic and steroid may be helpful. 60% of patients will get benefited by repeated injection at an interval of a week for six weeks (Ref. 2). Injection of scar with local anaesthetic mixed with steroid will produce long term relief (Ref. 2).

NEUROMA :

A palpable neuroma, loss of sensation in the scar and elicitation of pain on touch are diagnostic. Repeated injection of local anaesthetic with steroid may relieve the pain. If there is no relief cryolysis may be helpful.

MYOFASCIAL PAIN :

Skeletal muscles are contractile muscle tissues which are subjected daily for wear and tear. Any muscle can develop

myofascial trigger point that can cause pain and muscle spasm. (Ref. 17). Clinical signs and symptoms may appear with muscle strain or may start as a sequelae to muscle fatigue. The myofascial pain will be continuous, deep and aching and may be aggravated by the muscle stretch or by the pressure on the trigger point. This may also be associated with limitation of joint movement and anatomic dysfunction. On examination hyper-irritable focus with a tight band of skeletal muscle localised on the muscle or its fascia (Ref. 18). Active trigger point will produce pain whereas inactive trigger point will produce limitation of movements and weakness in the affected muscle. Local examination may elicit twitch response - "Jump Sign". (Ref. 2).

MANAGEMENT OF MYOFASCIAL SYNDROME :

Aim is to control pain, improve function and prevent permanent disability. This can be achieved by muscle relaxation, trigger point injection and exercise programme (Ref. 3).

PAIN FROM INFLAMMATION :

Soft tissue pain are due to Bursitis, Tenosynovitis, Fibrositis. They are managed mainly by physical measures (Deep heat, massage, Physiotherapy and TENS), NSAID and psychotherapy (Relaxation, Bio-feed-back technique). In refractory cases local anaesthetic with steroid will be helpful.

PAIN FROM SPRAINS AND STRAINS :

Examples are tennis elbow, groin strain, lumbosacral pain, and posterior compartment syndrome. Treatment consists of physical measures, local anaesthetic injections and exercise programme.

SYMPATHETIC MEDIATED PAIN (S.M.P.) :

a) R.S.D. and Causalgia

b) Peripheral Vascualr Disease

R.S.D. AND CAUSALGIA :

RSD may occur after a minor injury to neural structures for example fracture, soft tissue injury. Causalgia will follow a partial injury to a major nerve. Clinical examination will reveal signs and symptoms of sympathetic over activity in the limb affected. Pain is of typical burning character. Adequate therapy with repeated sympathetic block and physical therapy will produce permanent relief in the early stage.

PERIPHERAL VASCULAR DISEASE :

Sympathetic pain can be caused by peripheral vascular disease. The common examples are Reynold's disease, TAO and Arteriosclerosis obliterans. Repeated anaesthetic block of the sympathetic chain will produce good relief of pain.

VISCERAL PAIN SYNDROMES :

Common examples fro which local anaesthetic nerve blocks useful are acute MI, pancreatitis and ureteral and biliary colic.

ACUTE MYOCARDIAL INFARCTION :

Failure of medical line of treatment with analgesics will be an indication for sympathetic blocks Stellate block will give 12-14 hours of pain relief.

CHRONIC PANCREATITIS :

Failure of medical line of treatment for control of pain is an indication for coeliac block.

CHRONIC PELVIC PAIN :

Intractable pain is an indication for bilateral lumbar sympathectomy.

POST-HERPETIC NEURALGIA :

Burning pain allodynia persists after the initial infection of acute herpetic skin infection. Post herpetic neuralgia occurs in patients who are above the age of 64 and in patients who are on immunosuppressants eg., Cancer patients on CT, after renal transplant. The aim of treatment is adequate analgesia. Medical line of treatment are antidepressants, anti-convulsants, nerve blocks. Physical measures and psychotherapy will be helpful. Nerve blocks useful in post herpetic neuralgia are

1. Local infiltration
2. Somatic nerve block
3. Sympathetic block with local anaesthetic and steroid mixture.
4. Epidural block.

POST - AMPUTATION PAIN SYNDROMES :

Stump pain are of two types.

1. R.S.D. Type
2. Pain at the stump

Phatonm Limb pain are of two types ie.,

1. Burning type like RSD
2. Phantom limb pain (severe)

NERVE BLOCKS :

In patients who present with burning pain with sympathetic overactivity, sympathetic block or Intravenous Regional Sympathetic block will be effective in relieving pain. In the diagnostic block helps, repeated injectionat frequent intervals will relieve the pain.

CONCLUSION :

After the diagnostic block, once the diagnosis of pain is established, therapeutic block can be used to offer pain relief on long term and permanent basis, especially when these methods are combined with appropriate physical therapy and other modalities of multidisciplinary approach, to restore the muscle to normal length, power and improve joint function. The sympathetic block, trigger point injection and other local anaesthetic blocks have been extremely useful to reduce pain and increase the ability of patient to function better and utilise other modalities for a greater benefit.

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