

Role of Alternative Methods in Relieving Postoperative Pain

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ABSTRACT :

Postoperative pain is commonly treated with various drugs and block techniques. Slowly clinicians are realizing that atleast some of the alternative methods could also be used for managing the postoperative pain (in addition to chronic pain) atleast in combination with more established methods like TENS, acupuncture, intra-operative suggestions and relaxation techniques like biofeedback. Further controlled studies are needed to establish the value of any or all of these techniques.

KEY WORDS : Postoperative pain relief, Alternative methods, Acupuncture, TENS, Suggestion, Biofeedback.

The International Association for the Study of Pain (IASP) defines pain as, “an unpleasant sensory and emotional experience associated with actual or potential tissue damage.¹” Here it is important to emphasize that pain is always unpleasant, subjective and a sensation, thereby it is essential that we evaluate and treat both the physical and nonphysical components.

The systemic administration of analgesics and various local and regional block techniques are by far the most common means of treating postoperative pain. This is further evident by the fact that in a chapter on “acute pain treatment” in the “Advances in Anesthesia”, published in 1996, there is no mention of even the name of any of the alternative methods of pain relief². However, as the pharmacological therapy alone is quite often likely to be inadequate for relief of the acute pain³, hence the need of other methods such as blocks and alternative techniques etc.

Alternative Methods :

The single most important factor in managing acute pain is placing the emphasis on prevention. Prevention or early treatment will avoid or atleast reduce the muscle guarding and dysfunction that result otherwise.

As pain is essentially an integration of physical, physiological and social factors, various alternative modalities have also been used to alleviate pain including acute post surgical pain. Among these, acupuncture, transcutaneous electrical nerve stimulation (TENS), cryoanalgesia and psycho-emotional interventions e. g. hypnosis, biofeedback and intra-operative suggestions are commonly used techniques.

Advantages of Alternative Methods :

1. Being nonpharmacological, they are devoid of unwanted side effects of analgesics, local anesthetics and adjuvant such as, respiratory depression, sedation, postural hypotension, urinary retention, drug reaction and problems of drug delivery system.
 2. These are non or minimally invasive techniques.
 3. May replace / reduce the use of opioids in known or suspected drug abusers. May be given concomitantly with opioid. NSAID's or nerve blocks in such patients as recommended by US Agency for Health Care Policy and Research (AHCPR)³.
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Acupuncture :

Acupuncture involves insertion of 28-30 gauge pre-sterilized stainless or aluminum needles into selected points. The depth of penetration varies, and a sensation of “take” described as tingling, numbness and heaviness is felt by the patient if the procedure is to be successful. The needle is spinned and turned round and round with finger to achieve a sensation of take⁴.

Once the needles are inserted, they may be further manipulated by hand or by electrical stimulation. Currently, electrical stimulation of 2-100Hz (commonly 4-15 Hz) is the preferred method of stimulation as the hand method is extremely difficult. The electrical stimulation appears more effective as the stimulation is more uniform and provides better-controlled stimulus.

Mechanism of Action :

A review of available literature on the action reveals the possibility of a multitude of mechanisms such as release of endogenous opioids, counter irritation or as an adjuvant to physiotherapy.

Even though an extensive research done on the effect of acupuncture on central nervous system (CNS) has improved our understanding of neurophysiology, it has not definitely explained its mode of action. There seems to be no doubt that acupuncture increases the endorphin level in various parts of CNS, the naloxone can block acupuncture analgesia.⁵ and, that the injection of endorphin antisera also reduces the acupuncture analgesia.⁶ The role of opioid has not been settled, as the type of endorphin produced varies with the intensity of stimulation and acupuncture also produces generalized vasodilatation.

Those who practice acupuncture believe that it has to be performed correctly to get good results. In fact, there is no substitution for experience and clinical acumen. Still one of the most difficult aspect of acupuncture to accept is the location of needle points which seems to have

no relationship to any anatomic structure directly relating to nervous system.

Studies have shown that acupuncture need not be applied precisely at the classical points. Stimulation close to the site of pain is generally more effective and even stimulation at non-acupuncture points was equally effective.⁷ It also appears that needle puncture is not essential, and that an analgesic effect can be produced even by intense sensory stimulation. Thus the crucial question is, whether these acupuncture points are any different from any other points where an acupuncturist may insert a needle.

Present Status :

Richardson and Vincent⁸ in their exhaustive review of reported studies on acupuncture analgesia found good evidence from controlled studies for a short-term relief in clinical pain. However, most studies were conducted without no treatment or placebo control groups. Thus no conclusion could be drawn on the effectiveness of acupuncture in relieving pain. When comparing other alternative methods such as TENS and physiotherapy, the majority of studies found no statistically significant advantage of acupuncture.

Most studies reporting clinical pain relief after acupuncture have included non-surgical acute painful conditions e.g. muscular skeletal pains and various forms of headache such as migraine. Although the ability of acupuncture to reduce most acute and a few chronic pains can be accepted, it appears to have less relevance in treating post surgical pain, as there is a need for multiple manipulation of needles close to the surgical field which is usually tender and covered with bandage. However, there are favorable reports of P-6 acupuncture point stimulation in the prevention of postoperative nausea and vomiting (PONV).⁹ The National Institute of Health (USA) has approved acupuncture only for a few non-painful applications e. g. PONV, nausea and vomiting during pregnancy, chemotherapy and for postoperative dental pain.¹⁰

Role of Alternative Methods

Transcutaneous Electrical Nerve Stimulation (TENS) :

In TENS, controlled low voltage electrical pulses are applied to the nervous system through skin. Though well accepted as a treatment modality for chronic pain management, the TENS has only a variable level of acceptability for the treatment of postoperative pain. In addition to conventional method, of TENS, an acupuncture like TENS and pulse-train / burst TENS are also popular TENS techniques.

In conventional technique (high frequency, low amplitude) for postoperative analgesia, the TENS is delivered through sterile, gelled electrodes applied to skin at 1cm away on both sides of the suture line. An electric pulse with a stimulus frequency of 80-150 pulses / sec and an amplitude of 12-20 Hz is used. A pulse of correct amplitude will provide analgesia without visible muscle contraction. In acupuncture like TENS (Acu-TENS), the analgesia due to alleged release of endogenous opiates is noticed only with recruitment of motor fibers and the resultant visible muscle twitches. In this type, the stimuli given at a rate of 1-4 pulses / sec and the amplitude is adjusted to produce visible twitches¹¹.

Pain Relief :

The conventional TENS can provide rapid-onset, continuous analgesia for 48-72 hours. In case of low rate TENS (Acu-TENS or Burst TENS), the onset of analgesia may be delayed upto 30 min and the duration is usually prolonged but for lesser period than the conventional TENS. The high amplitude and longer duration stimulation of Acu-TENS may make patient uncomfortable with residual muscle fatigue. A lower current setting in burst TENS will cause a more comfortable sensation.

Although many studies on TENS claim a considerable relief in postoperative and other acute pain.¹² A few others have failed to demonstrate any decrease in opioid requirement in the postoperative period.¹³

Cryoanalgesia :

Superficial cold therapy may be instituted by covering the area with ice, cold water, chemical packs or more often through specially designed cryo units or cryotherapy needle probes using a percutaneous approach. It provides analgesia by decreasing muscle tone, swelling and inhibiting plasticity.

Although cryoanalgesia is gaining popularity in the management of chronic pain, its extension to most post-surgical pain conditions seems impractical. Cryo induced nerve block has a duration greatly exceeding the usual duration of acute pain and it may also block the motor function.¹⁴ The resolution of the block by nerve regeneration may be accompanied by a prolonged period of hyposthesia. However, there are many reports of effective post-thoracotomy pain relief by intra-operative intercostal nerve freezing or by applying percutaneous cryo to intercostal nerves in the immediate postoperative period.

Intraoperative Suggestions :

Emotional distress often provides the most striking evidence of pain. Most clinicians believe that many postoperative patients may be in emotional distress as well as suffering from pain. Studies have shown that more anxious patients require more analgesics following surgery.¹⁵ It is also reported that psychological support in the form of preoperative discussion, reassurance and giving information results in less anxiety and less opioid use after surgery. Preoperative listening to relaxation tapes results in reduced analgesic need and a smoother recovery.¹⁶

On one hand, Studies including that of Block et al,¹⁷ suggest that unconscious or implicit memory may occur under general anaesthesia. On the other hand, Bennett et al,¹⁸ reported that the subjects given intra operative suggestions did not recall the event. Even then we may infer from variable reports that atleast in some patients, implicit memory does occur under general anaesthesia, thus positive

suggestions may bring benefits to such patients. However, studies conducted on intraoperative suggestions are very few, we need to know more before determining its place as a modality for post-surgical pain relief.

Other Psychotherapeutic Interventions :

Hypnotic interventions and relaxation techniques like biofeedback are the other two modalities which have been tried for pain relief. Hypno-anaesthesia for relieving surgical pain has been in use since long before introduction of general anaesthesia in 1846. Subsequently hypnotic suggestions have been used successfully for the treatment of acute experimental and clinical pain. It was noted that greater the level of susceptibility, greater the likelihood of pain relief.¹⁹ It was observed that hypno-analgesia reduces both the sensory pain and suffering components of acute pain and the pain relief is not attributable to anxiety reduction only.²⁰

Even though there are many reports on the efficacy of hypnotic suggestions for experimental and intraoperative pain relief (and amnesia), there is hardly any reported study on postoperative pain being treated with hypnosis. Most studies imply that intraoperative hypnoanalgesia will prevent pain occurring in the postoperative period. Clearly we need to know more and probably need to learn the complex psychotherapeutic technique itself before giving any definitive comment.

In biofeedback, a psychophysiological state of low arousal i.e. relaxation responses is induced either by electromyographic, thermal or cephalic blood volume pulse feedback methods.

Though much popular for the treatment of chronic pain, biofeedback has limited, if any, role for acute pain relief.

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