



Intra - Operative Celiac Plexus Block – An Invaluable Tool for Upper Abdominal Surgeries

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Abstract

There are many regional techniques available to the anesthetists for upper abdominal surgery and intra-operative blockade of the celiac plexus is potentially one of the most effective methods for providing pain relief. However, it is also under-utilized. Not only does this block ensure good pain relief, it also decreases stress response, improves gut motility and post-operative pulmonary function. It is a simple and safe procedure and has the advantage of less discomfort, decrease procedure time, use of smaller volume of local anesthetic, avoids puncture of aorta and ensures proper placement of needle tip.

Discussion

An important aspect of improved post-operative outcome in Upper Abdominal Surgery (UAS) is good post-operative pain relief and decrease stress response. Various articles have shown that post-operative pain and neuro-endocrine response are the inevitable consequence and the most common cause of morbidity in UAS by increasing the incidence of surgical wound infection, decrease patient satisfaction and increase patient discomfort, risk for cardiovascular complications, erosion of body mass and tissue reserve and post-operative pulmonary lung dysfunction such as hypoxemia, atelectasis, hypoxia, hyperventilation, increase pulmonary shunt, splinting of the accessory muscles of respiration, loss of sighing and a loss of vital capacity between 50% to 75% [1-8]. There are many regional techniques available to the anesthetists for such surgeries and intra-operative blockade of the celiac plexus is one of the most valuable tools for providing pain relief and decreasing stress response, but unfortunately, this block is not fully exploited. Celiac Plexus Block (CPB) was first started in 1914 by Kappis [9] to block the splanchnic nerves and celiac plexus with local anesthetic for surgical anesthesia percutaneously. In 1921, Braun [10] performed the intra-operative approach to block the celiac plexus and the splanchnic nerves by gently retracting the stomach and placing a digit between the aorta and the inferior vena cava to serve as a guide to the injection of an anesthetic agent over the ventral surface of the first lumbar vertebra. This technique was further popularized by Bridenbaugh et al. [11] who describe effective pain relief in 98% of their patients receiving CPB for upper abdominal cancer pain. Now, CPB is done to relieve pain associated with intra-abdominal pathologies using local anesthetics or neurolytic solutions, with the help of Ultrasound or CT scan. This short article describes the benefits of Intra-operative Celiac Plexus Block (ICPB) for post-operative analgesia in patients undergoing UAS. ICPB is known as a simple and safe approach and has the advantage of less discomfort, decrease procedure time, use of smaller volume of local anesthetic, avoids puncture of aorta and ensures proper placement of needle tip [10]. CPB is observed to cause significant reduction in blood glucose and serum cortisol level [12] and a combination of somatic and sympathetic blockade is further more effective in reducing stress response [13,14]. Complete sympathetic denervation of the GIT allows unopposed parasympathetic activity and increase peristalsis, thus promoting forward gut motility, which could be an advantage in preventing post-operative ileus. The good pain relief provided by ICPB leads to improvement of respiratory functions and thus fewer chances of pulmonary complications leading to a more favorable outcome. The complications of ICPB are hypotension and diarrhea (due to unopposed parasympathetic activity and increase peristalsis). Diarrhea is usually self-limiting and hypotension is orthostatic in nature and can be easily treated with intra-venous fluids and abdominal binders, and usually resolve within 48 h [10]. Other complications like inadvertent intravascular injection, neurologic complications and visceral injury has also been described [10]. Addition of a vasoconstrictor such as adrenaline to the local anaesthetic decreases the systemic absorption of the drug, prolong its effects, and increase the depth and duration of analgesia as well

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as providing a marker for inadvertent intra-vascular injection [1,15]. Bupivacaine itself exerts anti-microbial activity which would further allay fears of endangering sterility [16]. Intra-operative Celiac Plexus Block (ICPB) is easy, fast, and effective but despite its simplicity, unfortunately most surgeons are unfamiliar with or hesitant to adopt the technique. A study by Rapsang AG [1] in UAS, in addition to ICPB the author also gave wound infiltration as the combination of somatic and visceral nerve blockade provide excellent pain relief and modifying the stress response effectively. In the study, the author used 10 ml - 15 ml of 0.25% bupivacaine with 1 in 2 lakh adrenaline. The study confirmed that ICPB with bupivacaine provides excellent post-operative analgesia. The patients who received the block were also more alert than the control group because of the less consumption of post-operative opioids. The study also shows that ICPB significantly obtunds the surgical stress response, improves gut motility but found no difference in pulmonary function between the study group and the control group as post-operative pain relief was good in both the groups (control group – Patient Control Analgesia morphine pump; study group – ICPB). The author also noted that there is no incidence of hypotension or diarrhea or any other complication. In another study by Hamid SK et al. [12], the effects of continuous ICPB (using bupivacaine) with wound infiltration was assessed on post-operative analgesia, stress response and pulmonary function in UAS. They found that pain relief was poor and they attributed this poor relief of pain to poor somatic afferent block afforded by wound infiltration by the local anesthetic. In a study by Okuyama et al. [17], the efficacy of ICPB was compared with pharmacological therapy in the treatment of pain caused by un-resectable pancreatic cancer in 21 patients. They found that the analgesic consumption of the ICPB group was much lower than the ones with pharmacological therapy alone, and there was no operative mortality or major complication related to the block. The incidence of adverse effects related to the analgesic drug therapy was also lower in the group of patients treated with ICPB, suggesting that the reduction in analgesic consumption is of real clinical benefit. In two different studies, Tsuji et al. [13] and Shirasaka et al. [14] studied the effects of ICPB on endocrine metabolic responses by assessing levels of adreno-cortico tropic hormone, cortisol, glucose, free fatty acids and urinary noradrenaline and compared them to patients receiving general anesthesia and epidural analgesia. Tsuji et al. [13] found significant decrease in stress response in the epidural and the ICPB group and Shirasaka et al. [14] found greater reduction of stress response in the ICPB group.

Conclusion

The results obtained in various studies showed that ICPB provide a good means of analgesia, decreases the post-operative stress response, improve gut motility and improve pulmonary function by providing good pain relief. It is also a simple and safe procedure which ensures an accurately placed local anesthetic solution and avoids the need for another invasive procedure for pain relief. This block is an invaluable tool for emergency procedures, where time constraint is there and hence can be used as an alternative to placing an epidural catheter.

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