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Original Research Article

A Randomized Comparative Assessment of Alcohol Solution and Methylprednisolone for Celiac Plexus Block in Patients Suffering from Persistent Abdominal Pain

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Conflict of interest: Nil

Abstract

Aim: To compare the effectiveness of a 50% alcohol solution and methylprednisolone for celiac plexus block in patients suffering from persistent abdominal pain, with the goal of managing their discomfort.

Materials and Methods: This study was conducted in the Department of Anesthesia, Patna Medical College and Hospital, Patna, Bihar, India for one year. A Retrospective study was conducted on patients with chronic abdominal pain which included patients of ASA physical status III and IV of both the sexes, aged between 35-75yrs suffering from chronic pancreatitis and carcinomas involving one of the following: gall bladder carcinoma, pancreatic carcinoma, hepatic carcinoma presenting with chronic upper abdominal pain who were unresponsive to NSAIDS, opioids and were hence managed with coeliac plexus block for pain management. The Patients were divided into two groups: Group A: Received 50% alcohol as adjuvant with 1% lignocaine and Group B: Received 80mg Methylprednisolone, as adjuvant with 1% lignocaine.

Results: Initial pain scores at the end of 1st month was same in both the groups. But the pain scores in the next subsequent months at the end of 2nd, 3rd.4th, 5th and 6th moths were less in group A when compared to Group B. The statistical analysis was carried out using Mann Whitney U test. The U value is 5. The critical value of U at $p< 0.05$ is 5 and hence the result is significant with P value of <0.05.

Conclusion: We concluded that the Coeliac plexus block performed using Alcohol 50% had less pain scores and is more efficacious than coeliac plexus block performed using 80mg Methylprednisolone in chronic pain management.

Keywords: 50% alcohol solution, Methylprednisolone, Celiac plexus block, Abdominal pain

Introduction

Chronic abdominal pain is a debilitating condition that significantly affects patients' quality of life, often leading to considerable physical and psychological distress. One of the primary interventional strategies for managing severe and refractory abdominal pain is the coeliac plexus block (CPB), which has been utilized for many years to provide relief for conditions such as pancreatic cancer, chronic pancreatitis, and other non-malignant abdominal pain syndromes. [1-3] The CPB targets the coeliac plexus, a network of nerves situated in the upper abdomen that transmits pain signals from the abdominal organs to the brain. The use of neurolytic agents, such as alcohol or phenol, and corticosteroids in CPB has been extensively studied to determine their efficacy in pain relief. Recently, the combination of 50% alcohol and methylprednisolone has gained attention for its potential benefits in managing chronic abdominal pain. [4,5] The coeliac plexus, also known as the solar plexus, is a dense network of autonomic nerves located near the diaphragm, around the origin of the celiac artery. It plays a crucial role in transmitting visceral pain from the upper abdominal organs, including the stomach, liver, pancreas, spleen, and intestines. CPB involves the injection of neurolytic agents to interrupt these pain pathways, providing significant relief for patients with intractable abdominal pain. Alcohol is commonly used as a neurolytic agent due to its ability to cause chemical neurolysis, resulting in long-lasting pain relief. The mechanism involves the destruction of nerve fibers, which reduces the transmission of pain signals. Corticosteroids, such as methylprednisolone, are added to the block to reduce inflammation and enhance the analgesic effect by inhibiting

inflammatory mediators. Recent studies have highlighted the efficacy of 50% alcohol in providing significant pain relief in patients undergoing CPB. [6-9] Methylprednisolone, a potent corticosteroid, has anti-inflammatory and immunosuppressive properties that make it an effective adjunct in pain management. When combined with alcohol in CPB, methylprednisolone can enhance the block's efficacy by reducing local inflammation and oedema, which are often contributors to chronic pain. [10,11]

Materials and Methods

This study was conducted in the Department of Anesthesia, Patna Medical College and Hospital, Patna, Bihar, India for one year . A Retrospective study was conducted on patients with chronic abdominal pain which included patients of ASA physical status III and IV of both the sexes, aged between 35-75yrs suffering from chronic pancreatitis and carcinomas involving one of the following: gall bladder carcinoma, pancreatic carcinoma, hepatic carcinoma presenting with chronic upper abdominal pain who were unresponsive to NSAIDS, opioids and were hence managed with coeliac plexus block for pain management.

The list of the patients fulfilling the above criteria's who underwent coeliac plexus block was obtained by department of Anesthesia, pain and palliative care medicine. The Patients were divided into two groups:

Group A: Received 50% alcohol as adjuvant with 1% lignocaine

Group B: Received 80mg Methylprednisolone, as adjuvant with 1% lignocaine

Then 9 patients in each group (total of 18 patients) were selected randomly by closed sealed envelope method. The demographic data including age, sex, medical and past history including the severity and duration of pain, time of the diagnosis of carcinoma, treatment history for the same, investigations (both blood and radiological) were collected. The patients on analgesics including strong opioids and whose pain scores were more than or equal to 7 out of 10 as per numerical rating scale score were managed by coeliac plexus block as per the institutional guidelines. General physical examination, airway assessment was done. High risk consent was taken for all the patients. Patients were kept NPO 6hrs for solids and 4hrs for liquids.

Technique of celiac plexus block was noted-fluoroscopic Trans aortic approach. The informed consent/ A blanket consent for the data usage had been taken at the time of conducting procedure along with informed consent for the procedure after explaining the patients and assuring them that their anonymity and privacy will be maintained and only the relevant data will be utilized for the study without revealing their personal identity. Patients were asked to take follow ups every week for 1st 4 weeks and monthly thereafter till 6months post procedure. Assessment of pain scores using numerical Rating Scale (NRS) was with the help of hospital records, case sheets and follow up notes. Rescue analgesia was given as per institution protocol.

Results

Table 1: Average Pain Intensity as per Numerical Rating Scale (NRS) at different intervals were noted

Group	30th day	60th day	90th day	120th day	150th day	180th day
A	3/10	2/10	2/10	3/10	4/10	6/10
B	3/10	4/10	6/10	7/10	7/10	8/10

Initial pain scores at the end of 1st month was same in both the groups. But the pain scores in the next subsequent months at the end of 2nd, 3rd.4th, 5th and 6th moths were less in group A when compared to Group B. The statistical analysis was carried out using Mann Whitney U test. The U value is 5. The critical value of U at $p< 0.05$ is 5 and hence the result is significant with P value of <0.05.

Discussion

The sympathetic innervation of the abdominal viscera originates in the anterolateral horn of the spinal cord. The celiac plexus comprises a dense network of interconnecting nerve fibers from the celiac, superior mesenteric, and aortic renal ganglia. Preganglionic fibers from T5-T12 travel with the ventral roots to join the white communicating rami, pass through the sympathetic chain, and synapse on the celiac ganglia. The greater splanchnic nerve (arises from T5-T10 nerve roots), lesser splanchnic nerve (arising from the T10/T11 nerve roots) and least splanchnic nerves (arising from T10-T12), they traverse along the vertebral body, through the diaphragm crus, enters into the ipsilateral celiac ganglion. These are the major preganglionic fibers of the celiac plexus. These nerves are in a narrow compartment made up of the vertebral body and pleura laterally, the posterior mediastinum ventrally, and the pleural attachment to the vertebral body dorsally and the crura of the diaphragm caudally. The volume of this compartment is approximately 10 cc on each side.

C-arm guided transaortic approach there are multiple techniques for coeliac plexus blockade like Trans crural approach, retro crural approach, Trans aortic technique. These can be performed by with

ultrasound guidance, endoscopic guidance, CT guidance, fluoroscopy guidance. Here, in our institution we follow fluoroscopy with C-arm guided transaortic approach. Methylprednisolone is a steroid which decreases the inflammation by dampening inflammatory cytokine cascade, inhibiting the activation of T cells, decreasing the extravasation of immune cells into central nervous system, facilitating the apoptosis of activated immune cells and indirectly decreasing the cytotoxic effects of nitric oxide and tumor necrosis factor alpha. Alcohol act by denaturation of proteins in the exposed nerve endings, thus damaging these nerves by precipitation and dehydration of the protoplasm which in turn blocks or interferes in the conduction through these nerves and impairs. Hence, by knowing which among these two is more efficient would help in choosing one over the other drug by weighing their pros and cons. Overall many study shows that coeliac plexus block is effective in treating upper abdominal cancer pains. In a randomized study conducted by Wong et al. [7] on 100 patients with pancreatic cancer, they found that pain scores documented over a duration of 6-week post procedure were to be lesser in the Coeliac plexus neurolysis group than with the group that received a sham block plus systemic therapy, and there were no significant differences noted regarding opioid consumption or its side effects nor the quality of life of the patient. But, in a same type of randomized study conducted by Polati et al.[11] the results showed no superiority of coeliac plexus neurolysis in pain relief but showed a decrease in the need of opioids and thus showing lesser side effects related to opioids. But, there are very less studies to compare alcohol and methylprednisolone. And as pain management and its duration plays an important role in improving the quality of life of the patients this study was conducted to know the supremacy of drug among these two. In a study conducted by Dhanalakshmi Koyalgutta et al. [6] to compare the effectiveness of alcohol versus phenol based splanchnic nerve neurolysis for treatment of intraabdominal cancer pain, the pain intensity post procedure was assessed statistically using a Wilcoxon rank sum tests which one month post-procedure pain scores were not different between those treated with alcohol (4.23 ± 2.69, 4 1, 9) versus phenol (3.87 ± 2.53, 4 [0, 10]; P = 0.66) and in addition, ESASs and MEDD weren't significantly different either. There was a small difference in the volume of neurolytic agent used between the 2 agents with 24.73 ± 8.89 mL (20 [10, 50]) used for alcohol and 20.24 ± 5.05 mL (20 [10, 30]) used for phenol (P = 0.0044). Similarly in our study compared alcohol50% and 80mg methylprednisolone along with 1% lignocaine as adjuvant in two groups of 9 patients each. We could compare that pain scores in group A were less than pain scores in group B with a significant p value.

Conclusion

We concluded that the Coeliac plexus block performed using Alcohol 50% had less pain scores and is more efficacious than coeliac plexus block performed using 80mg Methylprednisolone in chronic pain management.

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