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EVALUATION OF THE EFFECTS OF CT- GUIDED NEUROLYTIC CELIAC BLOCK FOR MANAGING INTRACTABLE UPPER ABDOMINAL PAIN

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ABSTRACT

The purpose of this study was to evaluate the therapeutic result of CT-guided celiac plexus block for managing intractable upper abdominal pain due to pancreatic carcinoma or chronic pancreatitis. We treated 22 cancer patients who were on regular narcotic medication.

After an IV infusion of 10mL/kg Ringer's lactate solution, all patients were rolled onto prone position, and lidocaine was used to infiltrate the skin and subcutaneous tissues. Then CT guided injection of the celiac plexus was performed with 25 mL 50% ethyl alcohol with 0.25% bupivacaine. Vital signs, quality of analgesia and any adverse effects were recorded.

The age range of our patients was 68.63±7.48 years and weight was 64.68±7.54 kg (mean±SD). All patients had a history of abdominal operation due to disease and also a history of morphine injection due to pain. In 100% of our patients, sedation in the first hour was gained; excellent pain relief was achieved in 86.4% of cases during the first 24 hours after the procedure. No serious complications occurred in the study, a 30% drop in systolic blood pressure or even more was found in 13.6% of the cases, while nausea and transient orthostatic hypotension requiring no treatment developed in 31.8% and 100% of the cases respectively, and mild diarrhea was reported in 18.1% of the cases for two weeks.

CT-guided neurolytic celiac block appears to be a safe and effective technique for relieving abdominal pain due to cancer.

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INTRODUCTION

Splanchnic nerve neurolysis or neurolytic celiac plexus block for the treatment of chronic abdominal pain was first reported by Kappis in 1914[1] This technique was considered dangerous and was soon abandoned. However when new imaging techniques became available, this technique was brought back into clinical use.[1,2] Computed tomography (CT) and ultrasound guided methods have already proved to be an effective imaging technique for positioning needles for celiac plexus block.[1] Celiac plexus block is one of the most useful regional anesthetic procedures in the management of severe abdominal visceral pain.[3,4] This technique has been used not only for the treatment of pancreatic cancer, but also for other abdominal malignancies as well as chronic non-malignant abdominal conditions such as chronic pancreatitis.[2,4,5] Most patients with pancreatic cancer have a 5-year survival rate of only 3% to 5%; because effective cancer treatment is limited in these patients, control of pain is the most important issue for their care.[4] Neurolytic celiac plexus block is associated with a reduction in analgesic drug administration and drug-related adverse effects.[2,3,4,5,6] CT-guidance allows the interventionist to locate the best puncture site on the skin, to give the needle the appropriate depth and inclination to avoid

passing through the pleura and vessels, and finally to check the correct position of the needle tip and the spread of neurolytic alcohol solution.[4,5,6] Reported common adverse effects of the celiac plexus block procedure have been transient, including local pain, retroperitoneal hemorrhage, hematuria, mild diarrhea, and postural hypotension.[5,6,7,8] The purpose of this study was to evaluate the effects of CT-guided celiac plexus block for managing intractable upper abdominal pain due to pancreatic carcinoma.

MATERIAL AND METHODS

We report on our experience with this approach to splanchnic nerve block under CT-guidance in 22 patients aged 41-76 years with advanced pancreatic carcinoma associated with disabling abdominal pain and requiring narcotic supplements.

Before the procedure, any bleeding tendency was ruled out and patients with a distended abdomen and difficulty laying prone, patients with abnormal coagulation tests and patients who obtained pain relief with oral analgesic drugs were excluded from the study.

The patients usually received intravenous Ringer's lactate solution 10mL/kg before the time of block, but premedication was not routinely given. Blood pressure was measured before, during and immediately after the neurolytic procedure. The patients were positioned prone on the CT table. The level of the 12th thoracic vertebra was localized using the scanogram facility of the CT scanner. CT slices were taken at this level to enable a suitable route to be planned, avoiding the aorta. The measurement facility was also used to calculate the distance between the proposed skin entry point and the point of injection as well as the angle of approach. After skin preparation and under local anesthesia, a 15-cm, 23 gauge needle with stylet was inserted nearly perpendicular. Frequent CT review of the needle position during insertion was employed. Further needle advancement was carried out slowly and the needle was then withdrawn to the subcutaneous tissues and repositioned or adjusted as often as needed (Fig. 1). The positioning of needles was confirmed by spread of contrast solution. A very small volume of air was sometimes injected to help in localizing the needle tip. After gentle aspiration to check for absence of blood withdrawal, when the CT scan demonstrated that the injected contrast medium was distributed within the retrocrural space, a test block with 2% Xylocaine 5 mL followed. If there were no complications and the patient had pain relief, then further retrocrural splanchnic nerve neurolysis was carried out with injection of 12.5 mL of absolute alcohol diluted with 0.25% bupivacaine to a total volume of 25 mL for each side. The procedure usually could be finished within one hour. The patient was sent to the nursing area in the

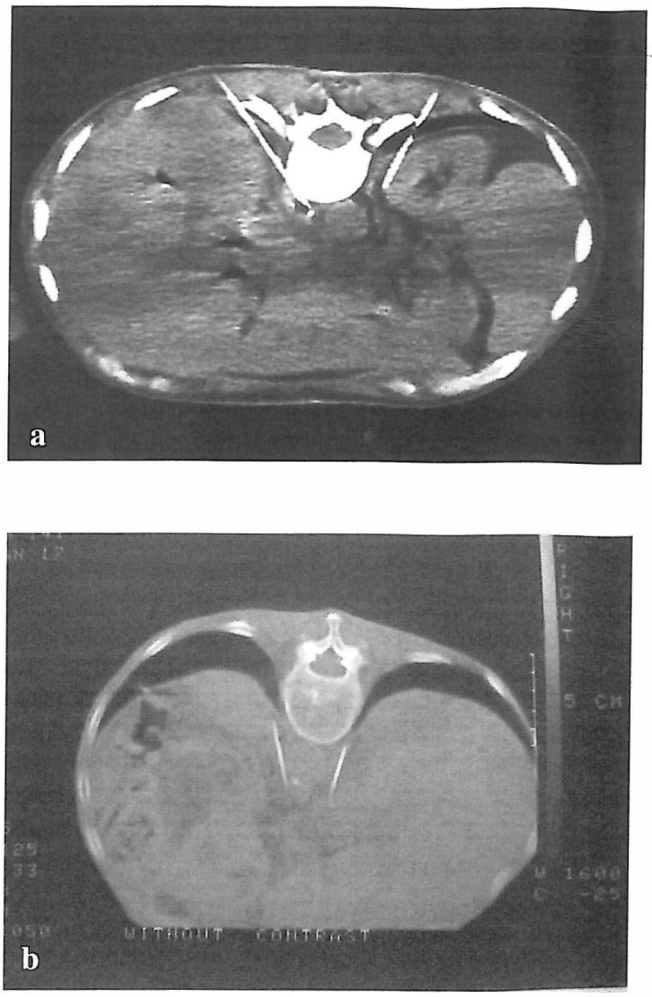

Fig. 1. Axial CT-scan showing correct needle direction and tip position for injection.

outpatient department for up to 2h observation. Following neurolysis, vital signs, orthostatic hypotension and any adverse effects were recorded. Pain relief was assessed by using both subjective and objective criteria. Subjective results were based on the patient's sensation of pain relief recorded in the chart by physicians and nurses. A score of 1+ was given when patients felt no change, 2+ when patients had mild to moderate relief of pain, 3+ when patients had considerable pain relief, and 4+ when patients had complete relief of pain. The degree of pain relief and adverse effects was analyzed immediately after celiac plexus block treatment, and followed at 2 weeks, 4 weeks and every 2 months until death. Statistical analysis of data was performed with the SPSS/PC, chi square test, ANOVA and t-tests.

RESULTS

Twenty-two cancer patients (15 men and 7 women)

Table I. Patients pain relief after the procedure (percent).

Excellent pain relief after the procedure (upper abdominal pain relief)			
Days	<90	90 -120	>120
Patients	18.1%	36.3%	45.4%

who were on regular narcotic medication were treated, the age range of our patients was 68.63±7.48 years and weight was 64.68±7.54 kg (mean±SD). All the patients had a history of abdominal operation due to the underlying disease and also a history of morphine injection due to pain. In 100% of our patients, some degree of sedation in the first hour was gained; excellent pain relief was reported in 86.4% of cases during the first 24 hours after the procedure, and narcotic analgesics were changed to a non-narcotic analgesic (acetaminophen) and a non-steroidal anti-inflammatory agent (diclofenac), morphine injection was discontinued gradually during the two weeks after the procedure. The first request for analgesics in 11 patients was 134.55±12.93 days (mean±SD) and 11 cases of our patients died before any request for analgesics (Table I). Survival after celiac plexus block in our patients was 130.72±39.23 days (mean±SD), the patients who had ascites (36.3%) showed a shorter survival after the procedure than those patients who did not have ascites (155.28±19.36 versus 87.75±24.58 days) (p<0.000).

No serious complication occurred in the study. Hemodynamic variables were recorded at the baseline, end of injection, the first hour and every 6 hours after the procedure for 24 hours (Table II, Fig. 2).

A 30% drop in systolic blood pressure or even more was found in 13.6% of the cases, while nausea and tran-

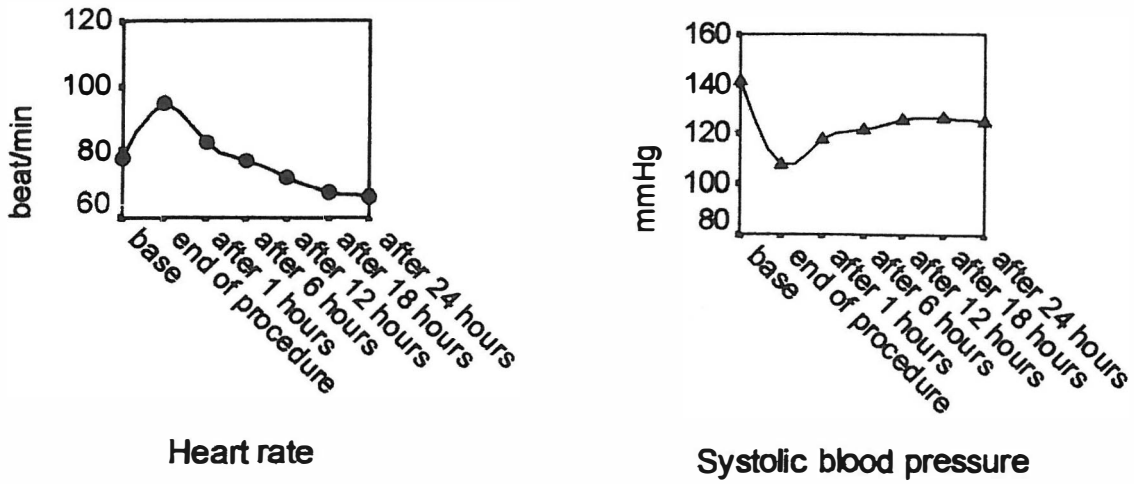

Fig. 2. Heart rate and systolic blood pressure changes in the first 24hr after the procedure.

Table II. Hemodynamic changes in the first 24 hours (p<0.05).

(mean±SD)	Baseline	End of procedure	1 hour	6 hours	12 hours	18 hours	24 hours	Tests
Heart rate	77.50± 10.55	94.54±9.50	82.72± 11.72	77.04± 9.46	72.04± 9.71	67.72± 8.12	66.59± 6.61	ANOVA p= 0.006
Blood pressure	141.36± 15.82	107.72± 10.43	117.7± 11.92	121.59± 13.74	126.13± 12.33	126.59± 11.58	124.77± 11.07	ANOVA p= 0.000
Orthostatic hypotension	0%	100%	81.8%		68.2%		18.2%	Chi-Square p= 0.003

sient orthostatic hypotension requiring no treatment developed in 31.8% and 100% of the cases in the first 24 hours after the procedure, respectively, and transient mild diarrhea was reported in 18.1% of the cases for two weeks.

DISCUSSION

The celiac plexus is composed of visceral afferent and efferent fibers from T5 through T12 paravertebral sympathetic ganglia. The plexus itself consists of a dense network of fibers interconnecting the right and left celiac ganglia, which lies over the anterolateral aspects of the aorta, bilaterally, This network encircles the celiac artery and the base of the superior mesenteric artery.[4] The major goal in the management of patients with inoperable cancer of the pancreas or other upper abdominal viscera is palliation. The resultant neurolysis can interrupt the transmission of upper abdominal visceral pain to the CNS for 3 to 6 months.[3]

The success of celiac plexus block depends on adequate spreading of the injected solution in the celiac area. Only complete spreading of the neurolytic solution in the celiac area guarantees long-lasting analgesia. The reported success rate of complete pain relief immediately after celiac plexus block is from 73% through 100%. However, when the celiac area is infiltrated or compressed by a tumor, or distorted by previous surgery, the spread of the neurolytic solution can apparently be influenced. As a result, the efficacy of the celiac plexus block procedure differed between patients with and without pancreatic cancer.[2, 3, 9, 11 and 12]

CT scan is considered the best imaging technique to document a correct needle tip position. In addition, CT scanning is useful to define the retroperitoneal anatomy, in determining the best route for needle insertion, and in documenting the contrast medium spread.

CT-guided celiac plexus block is a safe and effective method of pain control in patients with severe upper abdominal pain caused by pancreatic carcinoma or chronic pancreatitis. It may prevent deterioration in quality of life by the long-lasting analgesic effect, reducing drug administration and drug-related adverse effects, such as addiction to morphine or meperidine. We believe that celiac plexus block under CT guidance deserves more widespread use in patients with upper abdominal visceral pain due to pancreatic carcinoma or chronic pancreatitis.

CONCLUSION

The celiac plexus is primarily a sympathetic nervous system structure mediating nociceptive transmission from the upper abdominal viscera, including the liver and biliary tree, pancreas, kidneys, omentum, and the alimentary tract extending from the stomach to the large bowel (to the level of the splenic flexure). The placement of bilateral percutaneous needles from the midback to the celiac plexus (at the anterolateral border of the L1 vertebral body) allows injection of neurolytic agents; the resultant neurolysis can interrupt the transmission of upper abdominal visceral pain to the CNS for 3 to 6 months. CT-guided neurolytic celiac block appears to be a safe and effective technique for relieving abdominal pain due to cancer in patients who are experiencing intolerable pain and opioid dose-related side effects that should be considered as an adjuvant to common analgesic regimens at any stage.

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