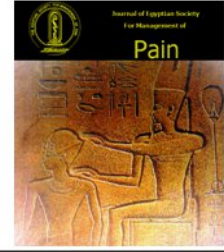




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EVALUATION OF TRANS-AORTIC OBLIQUE FLUOROSCOPIC TUNNEL VISION APPROACH OF CELIAC PLEXUS BLOCK AFTER FAILURE OF THE CLASSIC APPROACH

Dina N. Abbas, MD

Department of Anesthesiology, ICU and Algology Department, National Cancer Institute, Cairo University, Egypt.

Corresponding author

Dr. Dina Nabil Abbas,
Lecturer in Department
of Anesthesiology, ICU
and Algology, National
Cancer Institute, Cairo,
Egypt.
Mobile: 0123657038.
E-mail:
Dinanabil1@yahoo.com

ABSTRACT

The conventional techniques of neurolytic celiac plexus block (NCPB) sometimes cannot be used in patients who have organomegaly, or not be able to tolerate the prone position necessary to place the needles also anatomic anomalies may hinder obliquely placed needles from effectively reaching the target area. Complications such as organ puncture cannot be avoided with conventional techniques. The purpose of this study was to evaluate the safety and efficacy of approach of celiac plexus alcohol block.

Fifty patients with advanced upper abdominal cancer were included in the study. A single needle percutaneous transaortic oblique fluoroscopic tunnel vision view of the needle at the level of middle L₁ vertebra was applied. Visual analog score, daily morphine consumption, duration of the procedure, adverse effects, and Quality of Life Questionnaire-C30 were recorded.

No failure was recorded with expected adverse effects. The mean visual analog score, daily morphine consumption, and Quality of Life Questionnaire-C30 score were significantly decreased.

The oblique fluoroscopic tunnel vision approach of NCPB for upper abdominal cancer pain is proved to be safe and reliable.

Keywords: celiac plexus block; oblique tunnel vision view; abdominal cancer pain.

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INTRODUCTION

Celiac plexus is the largest sympathetic nervous system plexus that innervates the upper abdominal organs (pancreas, diaphragm, liver, spleen, stomach, small bowel, ascending colon and proximal part of transverse colon, adrenal glands, kidneys, abdominal aorta. The celiac plexus is embedded in loose areolar tissue, lies within the retroperitoneal space posterior to the stomach and pancreas close to the coeliac axis and is separated from vertebral column by crus of diaphragm. It overlaps the aorta at the level of first lumbar vertebra between the origin of celiac and superior mesenteric arteries. It is a dense ganglia around the aorta with considerable variability in size (0.5-4.5 cm), number¹⁻⁵ and position (T₁₂ -L₁ disc space to middle of L₂ vertebral body). It receives Preganglionic sympathetic fibers from splanchnic nerves, Preganglionic parasympathetic from vagus, Sensory fibers from phrenic and vagus, afferent

fibers concerned with nociception¹. Neurolytic celiac plexus block (NCPB) is one of the effective modalities for relief of intractable intra-abdominal pain due to malignancy or chronic pancreatitis. Many accounts of NCPB using a variety of indication and techniques²⁻⁵ were recorded since it was first described by Kappis in 1918⁶. However, conventional techniques sometimes cannot be used in patients who have organomegaly or anatomic anomalies such as extensive retroperitoneal adenopathy or tumor burden may hinder obliquely placed needles from effectively reaching the target area⁷. Furthermore, complications such as paraplegia, pneumothorax, and liver or kidney puncture cannot be avoided with conventional techniques⁷⁻⁹. Above that many patients with advanced disease may not be able to tolerate the prone position necessary to place the needles, despite that the transdiscal approach¹⁰ may avoid such complications but the risk of discitis, degeneration of the disc, or disc herniation cannot be ignored. The purpose of this study was to evaluate the safety and efficacy of a single needle percutaneous transaortic oblique fluoroscopic tunnel vision view of the needle at the middle of L₁ vertebrae approach of celiac plexus alcohol block.

PATIENTS AND METHODS

After approval of local ethics committee and obtaining informed consent, 50 patients with refractory intra-abdominal cancer pain were recruited from the National Cancer Institute clinic. Patients whom the classic approach had technical problems (patient can not lay prone, or due to organomegaly) or ineffective previous classic technique were included in the study. Patients who had any contraindications to regional blockade (coagulopathy, local infection at area of needle insertion, and mental disorders) or sympathetic blockade (severe hypotension or decompensated cardiac disorders) were excluded from the study. VAS of 0 to 100 mm (0 mm=no pain and 100 mm= worst pain imaginable) and Quality of Life Questionnaire (QLQ-C30)¹¹ were assessed before the procedure. Heart rate, noninvasive blood pressure, and oxygen saturation monitor were applied before and during the procedure. An intravenous catheter (18 G) was inserted in a peripheral vein. One gram of ceftriaxone (Rocephin) was given intravenously 30 minutes before performing the procedure; also one liter of a crystalloid solution was infused during the procedure. Midazolam 0.03 mg/kg and fentanyl 1 ug/kg were given intravenously for sedation. Usually, the blocks were performed with the patients in the prone position but if they could not tolerate the prone position, they were placed in the lateral position, and the block was performed using fluoroscopic guidance. We manipulated the C arm to coincide with the patient position (prone or lateral) to obtain anteroposterior view, to visualize T₁₂-L₁ disc, the fluoroscopy tube was angled in cranio-caudal axis to flatten the inferior end plate of T₁₂ then the tube is angled 35 degree to the left (for patients lying in prone position) or the intensifier is rotated upward to obtain oblique view (for patients laying in lateral position) to make the superior pars in the mid line. A tunnel view was used for needle insertion. Target point in the tunnel vision was just lateral to the middle of L₁ vertebra, local anesthesia was applied with 1% lidocaine, 5 ml at the needle insertion site, which was 2.5-4.0 cm from midline then we advanced the needle (15 cm, 20 G Chiba needle) till aortic pulsation detected then increased resistance with subsequent loss of resistance and cessation of blood flow from the needle; this means penetration of the anterior wall of aorta on the posteroanterior view (Fig. 1). Contrast

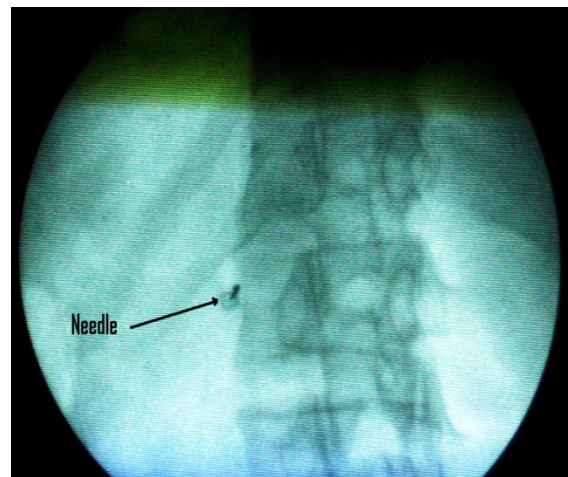


Figure 1. Oblique tunnel view of the needle.

dye injected and should remain midline (Fig. 2). Lateral view should confirm preaortic T₁₂-L₂ spread (Fig. 3) and is often pulsating; 20 ml of 75% ethyl alcohol was injected through the needle after a negative aspiration test. Patients were observed closely in the recovery unit for 1 hour after the injection and returned to the ward and were noticed for side effects and pain relief. Gradual opioid withdrawal was done according to needs of the patients. Duration of the procedure was recorded. The analgesic efficacy of the block was evaluated by assessing VAS and the total morphine consumption, before the block, 24 hours, 1, 2, 4, and 8 weeks after the block. Patient satisfaction was assessed by using QLQ-C30. This questionnaire was recorded before block, 1, 2, 4, and 8 weeks after the procedure, the lower the score is, the better the quality of life will be. Adverse effects related to the procedure such as needle induced pain, hypotension, diarrhea, and any motor disturbances were recorded in all patients.

Statistical analysis

Statistical analysis was carried out using stat view for windows software package version 4.57 (APACUS concepts, Berkely, CA). Data were represented as mean±SD, percentage, and number. Statistical analysis was performed using Wilcoxon signed-rank test for the VAS and QLQ-C30 score changed from the baseline. Morphine consumption was tested using paired t- test. Statistical significance was accepted for P value less than 0.05.

RESULTS

Between November 2009 and April 2011, patients were enrolled at the National Cancer Institute. Demographic, clinical data, morphine consumption of the patients, and the mean duration of the procedure are shown in table 1. The success rate (satisfactory pain relief VAS ≤3) was achieved in 98% after one day and after one week and reduced to 92% after one month and 90% after 2 months. The mean VAS decreased significantly (P<0.05) immediately after injection compared with the preprocedural period and was sustained at all study periods (table 2). The number of patients on morphine decreased significantly from 50 before the block to 13 at 1 week after the block and 15 and 18 at 1 and 2 months after the block respectively. At day 1, there was significant decrease (P<0.05) in morphine consumption to 75.6±13 mg compared with the preblock level and 1 week after the block, there was more decrease to 55.6±15 mg, and thereafter, morphine dosage was stabilized until 8 weeks after the block throughout the study. QLQ-C30 was decreased significantly (P<0.05) throughout the study after the block (table 3).

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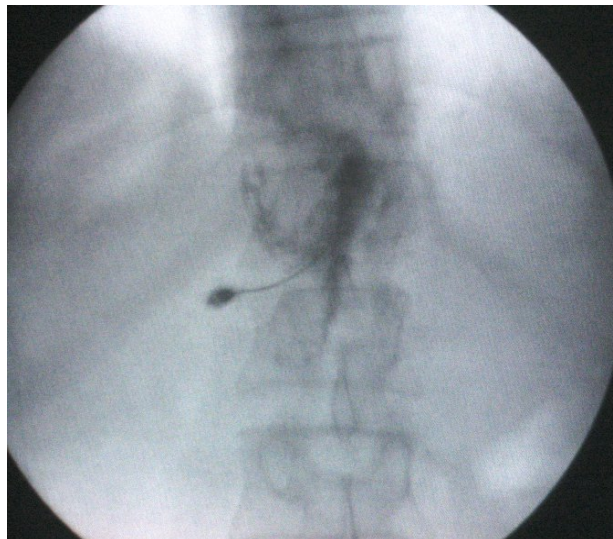


Figure 2. Dye distribution in anteroposterior view.

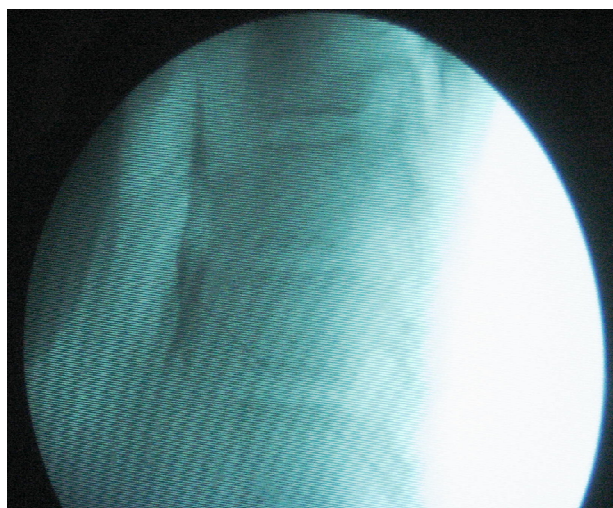


Figure 3. Dye distribution in lateral view.

Table 1. Patients characteristics and clinical data.

Variable	Rate
Male/female	29/21
Age (years)	62±12
Body weight (kg)	69±8
Height (cm)	163±6
Cancer diagnosis	
Liver cancer	9
Biliary carcinoma	18
Stomach cancer	5
Oesphagus cancer	8
Causes of failure of the classic approach	
Inaccessible classic approach	17
Patient can not lay prone	18
Failure of pain relieve	15
Morphine consumption pre block (mg)	140.5±20.5
Duration of the procedure (minute)	21.4±6.5

Data are expressed as mean±SD and number.

Table 2. Visual Analog Score throughout the study.

Variable	Rate
Before the block	73±5
24 hours	28±2*
1week	25±5*
2weeks	29±3*
4weeks	25±6*
8weeks	24±9*

Data are expressed as mean±SD.

*= significant compared to preblock value.

Table 3. QLQ-C30 score throughout the study.

Variable	Rate
Before the block	78±10
1week	43±9*
2weeks	39±6*
4weeks	38±8*
8weeks	37±8*

Data are expressed as mean±SD.

*= significant compared to preblock value.

Adverse effects throughout the study are listed in table 4.

Table 4. Visual Analog Scale throughout the study.

Variable	Rate
Needle-related pain	2(4%)
Liver or kidney injury	0(0%)
Pneumothorax	0(0%)
Neural injury	0(0%)
Failure to relieve pain	0(0%)
Diarrhea	25(50%)
Postural hypotension	10 (20%)
Supine hypotension	2(4%)

Data are expressed as number and %.

DISCUSSION

Abdominal cancer patients may experience severe pain that is resistant to oral or parenteral opioids. In addition, excessive sedation or other side effects may limit the acceptability and usefulness of oral or parenteral opioids therapy. Neurolysis of the sympathetic axis appears to be a safe, cost-effective approach to treating visceral pain associated with cancer. The benefits include improved analgesia, reduced opioid consumption, favorable economic implications, and superior clinical effects due to the deleterious properties of high-dose chronic opioid therapy. Current knowledge and techniques to perform these blocks allow these procedures to be performed safely and expeditiously. Pain practitioners should consider the role of these blocks in adjuvant therapy for the optimal treatment of cancer pain. The positive effect of NCPB was demonstrated by many studies^{12,13} Lilemoe et al. in 1993 in double blind randomized study compared chemical splanchnicotomy with 50% alcohol on patients with unresectable cancer pancreas with placebo, pain relief was significantly superior in the NCPB received patients compared with placebo¹⁴. In a prospective, randomized study, Ischia et al. evaluated the efficacy of three different approaches of NCPB in pancreatic cancer. Of 61 patients with pancreatic cancer pain, 29 (48%) experienced complete pain relief after the neurolytic block. The remaining 32 patients (52%) required further therapy for residual visceral pain due to technical failure in 15 patients and neuropathic/somatic pains in 17 patients¹⁵. Moore⁵ popularized the classic posterolateral approach with fluoroscopic or palpatory guidance to position needles on each side of the aorta. By using CT guidance, more precise needle placement and better spread of solution could be obtained⁷. The rate of initial pain relief immediately after block with the conventional method was 94%⁴ Matamala et al.¹⁶ described the percutaneous anterior approach to the celiac plexus using radiographic or ultrasound guidance. This approach may involve penetration of liver, bowel, pancreas, or tumor, and its safety and efficacy have not been established.

The present study revealed significant pain relief in Patients whom the classic approach had technical problems (patient cannot lay prone, or due to organomegaly) or ineffective previous classic technique, This was demonstrated by decrease in both VAS and morphine consumption. Many patients may continue on morphine as the pain may be mixed and has somatic element. There was also improvement in the quality of life as assessed by the QLQ-C30. Improvement in quality of life may be explained by improvement of the immune system because of better control of pain and depression, and increased ambulation secondary to reduction of pain leading to decreased complications and adherence to palliative care¹⁷. Decreased opioid consumption may improve the quality of life by decreasing sedative effect of opioids and enhance the immune system as it was shown that opioids had negative effect on immunity at the cellular level¹⁸. This is mainly because this approach made it possible to place the tip of the needle in the area close to the anterior wall of the aorta, despite the abnormal retroperitoneal

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anatomy that may be present in some cases. Positioning the needle tip adjacent to the anterolateral wall of the aorta in this technique may have facilitated maximum spread of alcohol. The celiac plexus lies over the anterolateral wall of the aorta bilaterally. While with the conventional bilateral approach⁷ the tip of the needle is placed at the points posterior to the aorta on the left and posterior to the inferior vena cava on the right. In the trans-aortic approach by Ischia et al.,¹⁹ the needle tip may pierce the aorta from side to side and sometimes it is difficult to encounter the aorta and may need many trials. The insertion point in our method is significantly closer to the midline compared to the conventional methods, which facilitates the ideal positioning of the needle tip just anterior to the aorta and is easy to locate the aorta at this entry point. We did not do diagnostic block before neurolysis as the clinical role of diagnostic block prior to NCPB is questionable and not warranted in patients with terminal malignancy. Yeun et al.²⁰ concluded that, a positive response to diagnostic block correlates positively with NCPB for abdominal visceral pain secondary to malignancy whereas it is a poor predictor when the response is negative.

Side effects after the celiac plexus block with alcohol were observed in our technique as well as in the conventional methods^{4,9}. These include postural hypotension and diarrhea or frequent bowel movement due to sympathetic nerve blockade. Needle induced pain was minimal as it was only single puncture at definite site with no need to manipulate the needle, no organ injury as no organ or other anatomic structures impede needle placement, while in the conventional approach, the needles may pass through the kidney when the distance from the spinal process of the vertebra to the needle insertion point is increased^{7,19}. The danger of kidney or liver puncture in this approach is almost negligible, because the needle insertion point in our approach is closer to the midline. In addition, needle placement requires less time and only a single needle was used.

In conclusion, the single left tunnel vision oblique fluoroscopic transaortic approach for celiac plexus block is easy and effective and was performed in 50 patients without encountering technical difficulties and without serious complications and can be done as an alternative to classic approach in cases where the classic approach is technically difficult or failed to relieve pain.

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