ORIGINAL ARTICLE

COELIAC PLEXUS NEUROLYSIS FOR PANCREATIC CANCER PATIENTS; RETROSPECTIVE ANALYSIS OF SHAUKAT KHANUM MEMORIAL CANCER HOSPITAL & RESEARCH CENTRE EXPERIENCE

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Background: Among all the abdominal cancers, pancreatic cancer is the second most common one. Majority of the patients present with an excruciating pain when they are diagnosed with the disease. Coeliac plexus neurolysis (CPN) is a procedure that can control the pain in pancreatic cancer while precluding further consumption of analgesics in higher doses and quantity. The procedure of neurolysis is performed by injecting phenol/alcohol into the coeliac plexus ganglionic neural network. There is a high proportion of pain relief with CPN in up to 80% of the patients. **Aim:** The aim of our study is to assess the pain relief after CPN, reduction in analgesics consumption and evaluation of patient satisfaction post procedure. **Methods:** A cross sectional study was done and we collected the retrospective data from December 2016 to November 2017. A total of 35 patients of either gender (male and female) were included in this study. Neurolysis was done with transcrural approach using 6% phenol. Follow up of patients was done after 1 and 4 weeks of the procedure. The patients were evaluated for pain scores on numeric rating scale (NRS), reduction in analgesia and patient satisfaction regarding the procedure and pain relief. The analysis was based on mean values. **Results:** Total numbers of patients were 35. The mean age was 54.11±12.51 (SD) years with a male to female percentage of 31.43% and 68.57%. Follow up was done after 1 week and 4 weeks. Patients reported decrease in mean pain score (1 from 9 in Males and 0 from 9 in Females), reduction in analgesics (81.8% among Males and 18.2% among Females) and over all patient's satisfaction was (72.7% Males and 27.3% Females). **Conclusion:** It has been observed from the results that CPN works effectively for pancreatic cancer patients. There is a strong recommendation of neurolysis in patients with pancreatic cancer pain as it improves the pain scores, significant reduction in analgesia consumption with good patient satisfaction.

Keywords: Coeliac plexus neurolysis; Pain scores; Patient satisfaction

Citation: Malik SH, Hafeez H, Malik NH, Ghafoor AUR. Coeliac plexus neurolysis for pancreatic cancer patients; retrospective analysis of Shaukat Khanum Memorial Cancer Hospital & Research Centre experience. J Ayub Med Coll Abbottabad 2018;30(4):516–9

INTRODUCTION

According to an estimate the annual death rate in Pakistan per 100,000 individuals from pancreatic cancer has elevated by 33.6% since 1990, with an average of 1.5% a year. For males in Pakistan the deadliness peak age is 80 and above. It is also estimated that the mortality rate is higher in men than as compared in women. During the last decade the prevalence of pancreatic cancer has elevated. Most of the patients are identified at the resectable stage (12–20%) along with vascular resection during pancreatectomy escalates the 30-d postoperative transience and illness rate[1,2]. Among the cancer categories, the overall survival for the pancreatic cancer patients at 05 years is around 10% for females and 6% for males. In the early stages of ca pancreas, the pain killing treatment is critical in the management of patients suffering from the disease[3]. In the preliminary stages, the pain is initiative but in the later stages of disease advancements somatic pain may develop, particularly due to peri-pancreatic attack on muscles and neural structures. Palliative care of the patients of the pancreatic cancer for pain normally started with the non-opioid medications like paracetamol and moved forward to opioids like tramadol and finally progressed to more potent opioids like fentanyl and morphine[3,8]. Though most of the times the opioid medication dosage reaches the upper limit due to failure in attaining the appropriate analgesia but severe nausea, addiction to opioids, respiratory depressions, constipation and such adverse effects limit their use. In these circumstances, methods of neuro-destructivity that involve core pancreatic pain pathways like coeliac block or coeliac plexus mostly seems effective[4].

Coeliac "plexus" is the biggest plexus of the sympathetic nervous system, innervating the organs of upper abdomen (small bowel, diaphragm, liver, pancreas, adrenal glands, spleen, kidneys, mesentery,

abdominal aorta, belly, ascending and the proximal part of the transverse colon). The coeliac plexus is present within the retroperitoneal space just posterior to the pancreas and stomach, adjacent to the coeliac axis, and it is parted from the vertebral column by the crus of the diaphragm. It encompasses a compressed network of ganglia round the aorta, with significantly inconsistent in size (0.5–4.5 cm), number and position (from the T12-L1 to the middle of the L2 vertebral body). The left coeliac plexus is characteristically situated more caudally than its equivalent to the right[5]. Coeliac neurolysis is done targeting either the entire plexus or just the ganglia[6,7].

The preganglionic sympathetic fibres of the coeliac plexus are gathered into the greater (T5–10), lesser (T10–11) and the least (T12) splanchnic nerves, and the plexus also receives parasympathetic fibres from the right vagus nerve as a coeliac branch. All of these fibres are blocked during splanchnicectomy performed under general anaesthesia[9].

Coeliac plexus neurolysis (CPN) is a procedure that can possibly improve the pain management in the patients of pancreatic cancer. CPN also contributes in prevention of further excess consumption of opioid analgesics. The procedure of CPN is completed by inoculating alcohol / Phenol into the coeliac plexus neural network of ganglia[10-12]. Different studies estimated that there is high percentage of pain liberation with CPN in up to 80% of the patients[7,13]. This study focuses on the assessment of pain relief after CPN, reduction in analgesia consumption and evaluation of patient satisfaction.

MATERIAL AND METHODS

The cross-sectional study was conducted at Shaukat Khanum Memorial Cancer Hospital & Research Centre Lahore. A total of 35 patients/subjects of either gender (male and female) were enrolled in this study from Shaukat Khanum Memorial Cancer Hospital Lahore. The data was collected from December 2016 to November 2017 from the enrolled patients. CPN the neurolysis was done via transcrural approach using 6% phenol. Detail follow up of patients was done after 1st week and 4th week of the procedure. In the study pain score before intervention was before the procedure of CPN and pain score after intervention was interpreted as the level of pain after the procedure of CPN. The patients were evaluated for pain scores on numeric rating scale (NRS), reduction in analgesia and patient satisfaction regarding the procedure and pain relief. The data collected through Numeric Rating Scale was entered in to SPSS version 20.0 and data was analysed using mean values and standard Deviations. The variables of the study were divided into independent and dependent variables. The independent variables include age, gender, and pain before intervention as value of these variables are not dependent and affected by any of the variables. The dependent variables include reduction in analgesia, patient's satisfaction, pain after intervention and mean difference in pain score. All of the dependent variables are dependent upon the procedure of CPN.

RESULTS

Table 1 presents the baseline description of 35 patients with a mean age and standard deviation of 54.11±12.52. The majority (68.6%) of patients were female and most of them (85.7%) had reduction in analgesia. The results show that mean age among the patients was 54.11±12.51. Mean Pain score before the intervention was 8.857±0.772 and pain score after the intervention on Numeric Rating Scale was 2.68±2.43. The study results show that there is significant decrease in Pain score on Numeric Rating Scale from 8.857 to 2.68. This study shows that the reduction in analgesia was in 85.71% while in 14.28% of the subjects/patients there is no reduction of analgesia. When patient's satisfaction was checked the study, results elaborated that 82.85%of the subjects/patients were found satisfied and 17.14% of the subjects were don't.

Table-2 presents the Mean±S.D Pain score before and after the intervention among the satisfied and not satisfied patients. The results show that mean pain score before and after the intervention was much higher in not satisfied patients, i.e., 9.00±0.89 and 7.50±1.96 respectively. While mean pain score among the satisfied patients before and after intervention was quite low as before the intervention 8.83±0.76 and after 1.69±0.71 respectively and found significant in mean testing.

Table-3 of this study is presenting the mean difference in the pain score which shows that there is a significant mean pain score difference with the mean value of 6.17±2.39.

Table-4 of this study shows significant reduction in analgesia among males and females which is 81.8% and 87.5% respectively.

When patient's satisfaction after 1 week was stratified with respect to sex of the subjects. The study results show that females (72.4%) were more satisfied than the males (27.6%)

The data was stratified with respect to gender. The stratification analysis shows that reduction in mean pain score before and after the intervention was quite higher in females (8.18–3.36) as compared to males (8.87–2.37). It has been observed from the results that CPN works effectively

and efficiently for patients diagnosed with ca pancreas. Therefore, it has a strong recommendation to do the coeliac neurolysis in patients with this disease as it improves the pain scores, significant reduction in analgesia consumption and overall good patient satisfaction. This study shows that among the males 72.7% were satisfied and 27.3 % were not while among the females 87.5% of the patients were satisfied with the treatment and 12.5% were not.

Table-1: Baseline characteristics

Variables	Frequency n (%)
Age in years	
Mean±standard deviation	54.11±12.52
Sex	
Male	11 (31.4%)
Female	24 (68.6%)
Reduction in analgesia	
No	5 (14.3%)
Yes	30 (85.7%)
Patient satisfaction	
Not satisfied	6 (17.1%)
Satisfied	29 (82.9%)
Pain score before intervention	
mean±standard deviation	8.86±0.77
Pain score after intervention	
mean±standard deviation	2.68±2.43

Table-2: Pain Score

Variables	Satisfied	Not satisfied	*p*-value
Pain score (before)	8.83 0.76	9.00±0.89	0.63
Pain score (after)	1.69±0.71	7.50±1.96	0.001

Table-3: Pain score before and after intervention (difference)

Variables	Characteristics		*p*-value
Pain score (Difference)	Mean±SD*	6.17±2.39	0.001q1`

Table-4: Reduction in analgesia

Reduction In Analgesia In Males	81.8%
Reduction In Analgesia In Females	87.5%

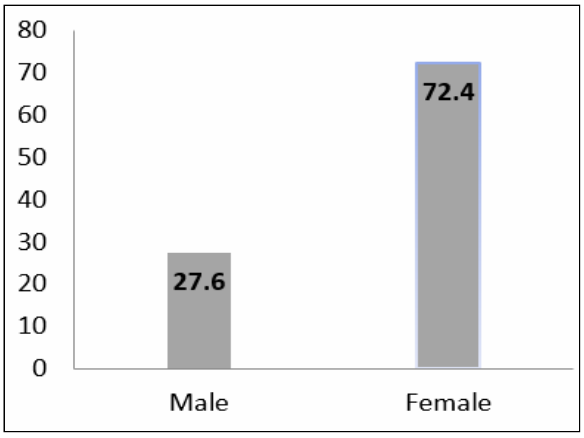

Figure-1: Satisfaction level of the subjects after 1 week

DISCUSSION

In the category of abdominal cancers pancreatic cancer is the second most prevalent cause of cancer in United States of America.[1,17] The American cancer society estimated that pancreatic cancer is with the 20% resectability at diagnosis and with overall rate of survival rate of 5%.[2] One of the main issues of the patients of pancreatic cancer was the pain sufferings of 70–80%.[3] Fluoroscopy guided coeliac plexus neurolysis (CPN) technique is said to be the technique that is meant to potentially alleviate the pain and also controls it while preventing further increase in the consumption of opioids.[4,8] The technique CPN is normally performed by injecting absolute 6% phenol into the coeliac plexus ganglionic neural network. This study determines the assessment of pain relief after CPN, reduction in analgesia consumption and evaluation of patient satisfaction. Our study results show the mean and standard deviation of the three variables. The results show that mean age among the patients was 54.11±12.51. Our study results shows the results that are inconsistent with several international studies like in a study conducted by Gilbert Y. Wong *et al*[5] the mean age of the patients were 62.6±11.3. In this study mean Pain score before the intervention was 8.857±0.772 and pain score after the intervention on Numeric Rating Scale was 2.68±2.43. The study results show that there is significant decrease in Pain score on Numeric Rating Scale from 8.857 to 2.68 by using 6% phenol. In the study conducted by Naresh T. Gunaratnam, *et al*[6] out of total 78% of the patients experience significant decline in pain score after CPN. Several international studies reported that by using 6% of phenol through transcrural approach results in significant pain reduction.[5,7,8] In this study reduction in analgesia was in 85.71%, In a study of meta-analysis on coeliac plexus neurolysis in the management of unresectable pancreatic cancer[9,17] the study results evaluates the significant decrease in analgesia and opioid consumptions. Nagels *et al*[10] also evaluated the same results and agrees with our study results. The study results elaborated that 82.85% of the subjects/patients were satisfied with the intervention. In the study conducted by Kawamata *et al* in 1996[11] it was evaluated that the pain control and satisfaction rate of patients was superior in the coeliac plexus neurolysis group.

It has been observed from the results that CPN works effectively for pancreatic cancer patients.[12–16] It is recommended in different international studies that EUS/fluoroscopy CPN should be considered as an important intervention in the effective and efficient pain management of the pancreatic cancer patients[17]. More randomized and

large-scale trials are required to conclude more reliable and significant results.

AUTHORS' CONTRIBUTION

SHM: Conception, design, drafting, data collection, acquisition, write-up and analysis of data. HH: Contributed to concept development. NHM: Write up, literature search, analysis and interpretation of data. AURG: Supervised the study and proof read the manuscript.

REFERENCES

1. Cokkinides V, Albano J, Samuels A, Ward ME, Thum JM. American cancer society: Cancer facts and figures. Atlanta: American Cancer Society; 2005.
2. Bilimoria KY, Benterem DJ, Ko CY, Ritchey J, Stewart AK, Winchester DP, *et al*. Winchester and Mark S. Talamonti, 'Validation of the 6th edition AJCC pancreatic cancer staging system. Cancer 2007;110(4):738–44.
3. Jemal A, Siegel R, Ward E, Hao Y, Xu J, Murray T, *et al*. Cancer statistics, 2008. CA Cancer J Clin 2008;58(2):71–96.
4. de Oliveira R, dos Reis MP, Prado WA. The effects of early or late neurolytic sympathetic plexus block on the management of abdominal or pelvic cancer pain. Pain 2004;11091):400–8.
5. Wong GY, Schoroeder DR, Cams PE, Wilson JL, Martin DP, Kinney MO, *et al*. Effect of neurolytic celiac plexus block on pain relief, quality of life, and survival in patients with unresectable pancreatic cancer: a randomized controlled trial. JAMA 2004;291(9):1092–9.
6. Gunaratnam NT, Sarma AV, Norton ID, Wiersema MJ. A prospective study of EUS-guided celiac plexus neurolysis for pancreatic cancer pain. Gastrointest Endosc 2001;54(3):316–24.
7. Eisenberg E, Carr DB, Chalmers TC. Neurolytic celiac plexus block for treatment of cancer pain: a meta-analysis. Anesth Analg 1995;80(2):290–5.
8. Mercadante S. Celiac plexus block versus analgesics in pancreatic cancer pain. Pain 1993;52(2):187–92.
9. Wyse JM, Chen YI, Sahai AV. Celiac plexus neurolysis in the management of unresectable pancreatic cancer: When and how? World J Gastroenterol 2014;20(9):2186–92.
10. Nagels W, Pease N, Bekkering G, Cools F, Dobbels P. Celiac plexus neurolysis for abdominal cancer pain: a systematic review. Pain Med 2013;14(8):1140–63.
11. Kawamata M, Ishitani K, Ishikawa K, Sasaki H, Ota K, Omote K, *et al*. Comparison between celiac plexus block and morphine treatment on quality of life in patients with pancreatic cancer pain. Pain 1996;64(3):597–602.
12. Siegel R, Ma J, Zou Z, Jemal A. Cancer statistics, 2014. CA Cancer J Clin 2014;64(1):9–29.
13. Jemal A, Bray F, Center MM, Ferlay J, Ward E, Foman D. Global cancer statistics. CA Cancer J Clin 2011;61(2):69–90.
14. Ilic M, Ilic I. Epidemiology of pancreatic cancer. World J Gastroenterol 2016;22(44):9694–9705.
15. Coughlin SS, Calle EE, Patel AV, Thun MJ. Predictors of pancreatic cancer mortality among a large cohort of United States adults. Cancer Causes Control 2000;11(10):915–23.
16. Fernandez E, La Vecchia C, Porta M, Negri E, Lucchini F, Levi F. Trends in pancreatic cancer mortality in Europe, 1955-1989. Int J Cancer 1994;57(6):786–92.
17. Sener SF, Fremgen A, Menck HR, Winchester DP. Pancreatic cancer: a report of treatment and survival trends for 100,313 patients diagnosed from 1985–1995, using the National Cancer Database1. J Am Coll Surg 1999;189(1):1–7.

Received: 3 October, 2018	*Revised: --*	*Accepted: 12 October, 2018*

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