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Original Article

Efficacy of cross-sectional imaging guided sympathetic neurolysis in abdoiniuopelvic tumors

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ABSTRACT

Aim of work: To study the efficacy of visceral neurolytic blocks in the abdominopelvic cancer when guided by ultrasound/CT.
Patients and methods: 50 patients were selected randomly and prospectively from the pain clinic in NCI suffering from moderate-severe visceral pain (visual analogue score ≥ 4) due to advanced abdominal and pelvic malignancy. Patients were divided into celiac plexus block-CPB (n = 25), superior hypogastric block-SHPB (n = 12) and ganglion impar block-GIB (n = 8) groups according to site of pain and then randomly and almost equally divided into subgroups of U/S and CT. Recording of baseline and postprocedure/follow up of visual analogue score (VAS), morphine consumption which constitute the primary outcome as well as patient global impression of change (PGIC) which represents the secondary outcome/quality of life. Complications at anytime during follow up were documented.
Results: There was significant ($p < 0.001$) reduction in post procedure VAS scores and morphine consumption after performing CPB and SHPB with satisfactory PGIC. Patients who performed GIB showed no significant change in pain scores or morphine consumption. There was a low complications rate with no major side effects.
Conclusion: This study shows that guided sympathetic neurolytic blocks significantly reduce abdominal/pelvic cancer pain and analgesic consumption with no significant complications.

1. Introduction

Cancer pain management remains a significant global problem inspite of great efforts to increase awareness and improve understanding of pain pathophysiology as well as implement standardized treatment guidelines of this distressing and debilitating symptom. The complex mechanisms that play a role in initiating and sustaining pain in cancer, combined with the dynamic nature of this disease, adds to the challenges that physicians face [1].

Cancer-related pain may be presented as a major issue of healthcare systems worldwide if we consider that the incidence of cancer was 12.667.470 new cases in 2008 and, based on projections, it will be > 15 million in 2020 [2].

In a -large scale- systematic review of the literature, pain prevalence ranges from 33% in patients after curative treatment to 59% in patients on anticancer treatment and to 64% in patients with metastatic, advanced or terminal phase disease. Pain has a high prevalence in specific cancer types such as pancreatic (44%) and head and neck cancer (40%).

Moreover, another systematic review of the literature showed that nearly half of cancer patients were under-treated, with a high variability across study designs and clinical settings. Recent studies conducted both in Italy and pan European confirmed these data, showing that different types of pain or pain syndromes were present in all phases of cancer (early and metastatic) and were not adequately treated in a significant percentage of patients, ranging from 56% to 82.3%. In a prospective study the adequacy of analgesic care of cancer patients was assessed by means of the Pain Management Index in 1802 valid cases of in- and outpatients with advanced/metastatic solid tumors enrolled at centers specifically devoted to cancer and/or pain management (oncology/pain/palliative centers or hospices). The study showed that, even in these centers, patients were still classified as potentially under-

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treated in 9.8–55.3% of the cases.

The failure to obtain acceptable pain or symptom relief prompted the inclusion of a fourth step to the WHO analgesic ladder, which includes advanced interventional approaches. There are a variety of techniques used by interventional pain physicians, which may be grossly divided into modalities affecting the spinal canal, called neuraxial techniques and those that target individual nerves or nerve bundles, termed *neurolytic techniques*. There are several sites for neurolytic blockade of the sympathetic nervous system for the treatment of cancer pain [3].

In gastrointestinal and pelvic malignancies, compression, invasion, or distension of visceral structures can result in a poorly localized noxious pain. Patients experiencing visceral pain often describe the pain as vague, deep, squeezing, cramping, or colicky. Celiac plexus neurolysis (CPN) can be employed for pain originating from the upper abdomen. Analgesia for pelvic organ involvement is possible with superior hypogastric plexus neurolysis (SHPN). Ganglion impar neurolysis (GIN) works best for poorly localized peri-anal pain that is frequently accompanied by sensations of burning and tenesmus. However no consensus has been reached for techniques, indications and timing of application of neurolytic blocks [4].

Aim of study:

1. To assess the efficacy and benefits versus risks and burdens of performing minimally invasive sympathetic neurolysis.
2. Interventional therapy should be planned as part of a comprehensive multimodal approach in cancer pain management that encompasses pharmacological, psychological, and behavioral therapy in equal measures [1]. More studies need to be performed.

2. Patients and methods

A prospective randomized study was conducted in National Cancer Institute, Cairo University, in the period from January 2015 till November 2016 after approval of the institutional ethical committee.

50 patients were selected randomly and prospectively from the pain clinic in National Cancer Institute suffering from moderate-severe visceral pain due to advanced abdominal and pelvic malignancy. Visceral pain was characterized by being diffuse dull aching pain/heaviness or colicky pain in the abdomen, pelvis or perineum as well as perineal burning pain which increases during micturition/defecation. Written informed consent had been obtained from each patient.

5 patients were excluded during the course of the study, 1 for having predominant somatic and neuropathic pelvic pain components, 1 for doing concomitant nanoknife treatment making pain assessment inaccurate and 3 for being injected using 60% alcohol which was later in the study modified to 100% concentration.

25 patients suffering from upper abdominal pain performed a celiac plexus block, 12 patients suffering from pelvic pain did a superior hypogastric plexus block and 8 patients suffering from perineal pain did a ganglion impar block.

2.1. Inclusion criteria

- Moderate to severe visceral pain visual analogue score (VAS) ≥ 4 in abdominal/pelvic region.
- Pain is refractory to medical treatment (including opioids and adjuvant therapy) or not tolerating opioids' side effects.
- Age 20–80 years old.

2.2. Exclusion criteria:

- Patients with local or systemic sepsis.
- Uncorrectable coagulopathy (INR > 1.5).
- Patients suffering from unstable cardiovascular, respiratory diseases.
- History of psychiatric disorders.
- History of drug abuse.
- Allergy to the used medications.
- Pregnancy.

2.3. Preprocedure preparation

The procedure was explained to all the patients and they were reassured that any residual pain after neurolysis would be managed optimally, in line with WHO guidelines. Patients should be warned of complications and side effects of the procedure and must fully understand that 100% pain relief may not be obtained.

Patients who consented for neurolysis had their computed tomographic (CT) scans reviewed for assessment of anatomy and feasibility of performing the block under imaging guidance. Coagulation profile was evaluated before the block.

All patients fasted for 6 hrs. Bowel preparation was ensured using activated charcoal and Bisacodyl. Intravenous access was established and 500 ml normal saline (NS) was administered along with prophylactic antibiotic and antiemetic drug. ASA-standard monitors (NIBP, pulse-oximetry and ECG) were used. ASA standard conscience sedation was administered as required.

In the preprocedure visit and just prior to performing the block, the patient was asked what his or her pain level was.

Patients should be taught to hold their breath during needle advancement, which was crucial to avoid injury to adjacent structures.

2.4. Technique of CT guided celiac/superior hypogastric plexus block

The patient was placed supine on the CT gantry “Optima CT540, GE, 16 slice” and a preliminary CT scan of the abdomen was performed without contrast to visualize the celiac and superior mesenteric arteries/aortic bifurcation. The initial scan was reviewed to confirm an adequate route to the plexus region. An appropriate skin site was chosen and sterilized. Local infiltration by 2% lidocaine at the port of entry. Using a single needle anterior approach a 15 cm 22-guage Chiba needle (Egemen international) was advanced under intermittent CT guidance to the fat-containing space just dorsal and caudal to the celiac trunk in antecrural position or retrocrural/splanchnic in cases of invasion of celiac plexus. It was common to traverse liver, colon, bowel, pancreas, etc., on the way to the celiac plexus (trying to avoid major blood vessels). In case of SHPB tip of the needle was placed positioned in the midline, anteriorly to the left iliac vein and just below the aortic bifurcation. Once the needle was in position, an injection of dilute contrast (Iohexol 350 mg iodine/ml “Omnipaque”) was performed (3 ml in CPB and 2 ml in SHPB). CT was done to confirm adequate spread of contrast otherwise the needle should be repositioned. After confirming a negative aspiration of blood 3 ml of Lidocaine was injected to confirm needle placement if patient level of pain improves and to decrease the burning pain caused by the alcohol injection. 15 ml of absolute alcohol was injected slowly (over 2 min) via the Chiba needle in CPB or 5 ml in case of SHPB. On the postprocedure CT scan, alcohol will appear hypodense. The needle was flushed by saline or lidocaine before pulling it out (see Figs. 1 and 2).

2.5. Technique of U/S guided celiac block

The patients were placed supine and the epigastrium sterilized. Using a “Phillips Affiniti 50G” ultrasound system with a low frequency curved probe (3–5 MHz) transducer was employed in the long axis for locating the origins of celiac trunk and superior mesenteric artery in the supine position.

Following this, the transducer was rotated to image the origin of celiac trunk along with its division into common hepatic artery and splenic artery. After local infiltration with 3–5 ml of 2% lidocaine, a 15-cm 22 gauge Chiba needle was introduced into the epigastrium, right or