

Characteristics of Major Complications Related to Continuous Epidural Anaesthesia

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Abstract

A prospective cross-sectional study was carried out at the Specialized Surgical Hospital in Medical City to assess the characteristics of major complications related to continuous epidural anesthesia. Demographic data, epidural procedure specifics, and problems (from the pre-anesthetic phase until resolution) were documented. Categorical variables were expressed as a number (%) whereas continuous variables were expressed as a mean (SD). Of the 120 patients enrolled, the mean age (SD) was 42.1 ±17.0 years old; 52.5% were in the age > 40 years old; 72.5% were male. The mean of BMI (SD) was 29.9 ± 5.2 kg/m². 18.3% of them underwent gynaecological surgery, while 27.5% underwent general surgery, 64.2% of surgeries took less than 60 minutes. The result of the present study reported more than a quarter of them were overweight, and the majority of patients exhibited levels indicative of a lumbar puncture. Epidural anesthesia was the cause of post-operative neurologic deficits in half of them, either new or worsening. Further researches are needed on large scale.

Keywords: Epidural anesthesia; Complication; Dural puncture; Hematoma

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Introduction

An approach for perioperative pain management with many uses in anaesthesiology is epidural anesthesia [1]. Although it can be used as a primary anesthetic, it is most frequently a pain control adjuvant [2]. For long-term pain treatment, either a single shot or a continuous infusion can be used [3]. Additionally, it has been demonstrated to shorten hospital stays, lower cortisol levels, speed up the recovery of bowel function, and reduce the risk of PE and DVT following surgery [4]. Improved knowledge of the pathophysiology and risk factors for problems would aid anaesthesiologists in using the procedure safely and reduce the likelihood of unfavourable outcomes [5]. Although a number of sizable studies have examined the dangers associated with epidural blocks, the majority of these studies did not examine a continuous cohort of patients and often only included patients with persistent pain, expectant mothers, or patients undergoing spinal-epidural anesthesia [6-9]. Because of this, it may be challenging to adapt the reported incidence of complications to a general surgical population or to compare it to those of other organizations or healthcare systems. Additionally, numerous severe occurrences brought on by epidural anesthesia have been documented in retrospective case series or individual case reports [10-12]. Only a small number of prospective surveys with sizable patient populations, the majority from several centers, have been reported [13-15]. From this point, this study aimed to assess

the characteristics of major complications related to continuous epidural anesthesia.

Methods

Between March 2023 and May 2023, a prospective cross-sectional study was carried out at the Specialized Surgical Hospital in Medical City to assess the characteristics of major complications related to continuous epidural anesthesia among 120 patients who had continuous epidural anesthesia in the medical city, demographic data, epidural procedure specifics, and problems (from the pre-anesthetic phase until resolution) were documented. Three anaesthesiologists who were blinded to all information but the patient's name, medical record number, surgical technique, and operation date performed the post-operative follow-up. The same anaesthesiologist saw each patient twice on the ward on the first and second postoperative days (24-48 hours following surgery). The level of pain related to the epidural itself was assessed on each occasion using an 11-point visual analog scale, with 0 denoting "no pain," 1-3 denoting mild pain, 4-6 denoting moderate pain, and 7-10 denoting severe pain. A neurological examination was also conducted on each occasion to identify any significant problems. Between the seventh and fourteenth post-operative days, all patients who had reported complications were re-interviewed over the phone. They were continued until the patient was unable or unwilling to

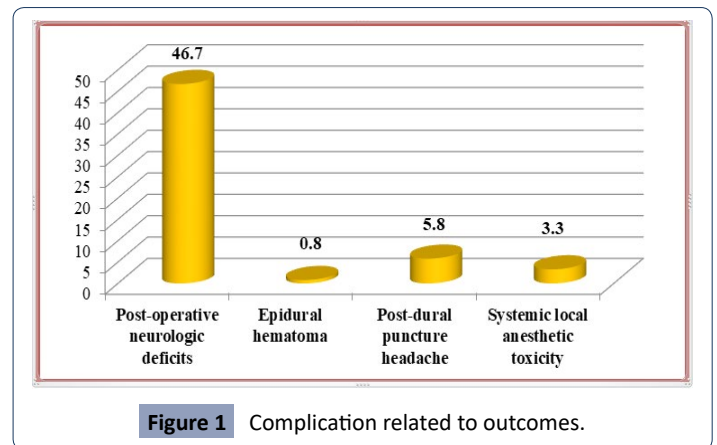
be reached again, the difficulties had fully resolved, or both. The length of the follow-up and the duration of the problems were noted. If neurological consequences persisted for more than six months, they were regarded as permanent. The two skilled anesthesiologists who had evaluated the initial assessment made the final determination that follow-up was finished in each case. Before we started gathering our data, we received ethical permission from the Iraqi Ministry of Health. The data were recorded into an excel spread sheet with each variable, and SPSS version 20 was used to analyze the results. Categorical variables were expressed as a number (%) whereas continuous variables were expressed as a mean (SD).

Results

Of the 120 patients enrolled, the mean age (SD) was 42.1 ±17.0 years old; 47.5% were in the age <40 years old and 52.5% were in the age > 40 years old; 72.5% were male and 45% had overweight of BMI. The mean of BMI was 29.9 and the SD was 5.2 kg/m². 18.3% of them underwent gynaecological surgery, while 27.5% underwent general surgery. According to **Table 1**, 64.2% of surgeries took less than 60 minutes, and 77.5% of patients had lumbar puncture levels. As indicated in **Figure 1**, of those 68 (56.7%), 56 (46.7%) had new or deteriorating post-operative neurologic impairments attributable to epidural anesthesia, 7 (5.8%) had headaches following dural puncture, and only 1 (0.8%) had an epidural hematoma.

Discussion

This study aimed to assess the characteristics of major complications related to continuous epidural anesthesia. One of the findings of the existing study is that 52.5% of people were over the age of 40 and 47.5% were under the age of 40. Elfeky et al. conducted a prospective, randomized, controlled clinical trial



in Egypt in 2019 with 100 patients 65 years of age or older of both sexes; their BMI was 28.9, and the surgery lasted 183.1(18.9) minutes [16]. A hospital-based cross-sectional study including 328 females was carried out in Saudi Arabia. The majority of the women (172, or 52.4%) were in their 30s and 40s. 106 women (32.3%) reported having an EA-positive previous pregnancy. A small minority of them (13 [12.3%]) had a history of issues, while the majority (93 [87.7%]) had no issues with EA. The side effects were absent in 77 (72.6%) of the participating ladies [17]. In the current study, there were 27.5% women and 72.5% men. In China, a survey of 5083 surgical patients receiving epidural anesthesia was done. Their mean age was 52.7± 17.0 years, with 3560 (70%) men and 1523 (30%) women present [18]. A high body mass index (BMI) has been associated with both epidural analgesia failure and more challenging neuraxial method performance [19]. Studies on the connection between obesity and regional anesthesia in the context of obstetric anesthesia frequently concentrate on the subarachnoid block and the lumbar epidural block [20]. 45% of participants in the current study had an overweight BMI, and 37.5% had an obese BMI. We were unable to demonstrate a clinically meaningful impact of thoracic epidural anesthetic on the frequency of major complications following elective heart surgery in compared to fast-track cardiac anesthesia without epidural anesthesia. Given the potentially deadly complications of an epidural hematoma following the installation of an epidural catheter, it is questionable whether this procedure should be utilized regularly in cardiac surgery patients who require complete heparinization [21]. In the current study, 18.3% of them had gynaecological surgery, followed by general surgery (27.5%) and thoracic surgery (9.2%). In a prospective study conducted in 2018 with 150 patients, 58.3% of whom underwent open surgery with epidural analgesia; Narayanappaa et al found that patients who receive epidural analgesia have better surgical results [22]. Spinal anesthesia combined with fast-acting local anaesthetics was preferred to general anesthesia in ambulatory procedures and was associated with high levels of patient satisfaction [23]. In the current study, 64.2% of procedures finished in 60 minutes or less, whereas 35.8% took longer. Capdevila et al. did a cohort study in 2020 at 33 commercial or public hospitals practicing ambulatory surgery in France, and they found that the mean and SD of the surgical procedure were 27.9 ±17.1 [23]. Karim 2021 noticed that 66 of the 286 patients had a delayed recovery, and a significant relationship was discovered with a p-value of 0.005

Table 1. Characteristics of the patient.

Characteristic	Frequency (n=120)	Percent	
Age(years)	< 40	57	47.5
	> 40	63	52.5
	Mean age ± SD	42.1 ± 17.0	
Gender	Male	87	72.5
	Female	33	27.5
	Mean age ± SD	29.9 ± 5.2	
BMI(kg/m ²)	Normal	21	17.5
	Overweight	54	45.0
	Obese	45	37.5
Type of surgery	Orthopedic	27	22.5
	Urologic	12	10.0
	General	33	27.5
	Gynecological	22	18.3
	Thoracic	11	9.2
	Vascular	15	12.5
Duration of surgery	< 60 min	77	64.2
	≥60 min	43	35.8
Puncture level	Lumbar level	93	77.5
	Thoracic level	27	22.5

among the 180 (62.94%) male patients. Rural residents are more likely to be patients 174 (60.84%). From the age of six months to 91 years old, the mean age was 42.8 ± 21.6 years. The majority of the patients were over 50 (44.05%), followed by those who were under 18 years old [24]. Post-dural (post-lumbar) puncture headache (PDPH) is a frequent and incapacitating consequence following an intentional puncture of the dura-arachnoid, whether for diagnostic, therapeutic, or spinal anesthetic purposes, or unintentionally during an epidural procedure. In the current investigation, lumbar puncture levels were identified in 77.5% of the patients [25].

Forty-eight (7.5%) of the patients in Brazil developed PDPH. Age [11.0% 31-50 years of age vs. 4.2% others, OR 2.21 (1.12-4.36); $p = 0.02$], gender [11.1% female vs. 3.6% male, OR 2.25 (1.07-4.73); $p = 0.03$], previous history of PDPH [26.4% positive vs. 6.2% negative, OR 4.30 (1.99-9.31); $p = 0.01$], and bevel orientation [16.1% perpendicular vs. 5. Between lumbar puncture and headache onset, there is a lag of 6 to 72 hours, lasting 3 to 15 days. Neck stiffness, tinnitus, hypoacusia, photophobia, or nausea were all present in 34/48 (71%) of the patients with PDPH, according to Amorim (2012) [25]. Retrospective data analysis of patients who underwent continuous thoracic epidural injections of local anesthetics was shown by Zengin et al. in 2021 [26]. Taking into account the fact that local anesthetics were not administered in high dosages or volumes, rates of hypotension and other issues that may have been connected were comparable across all groups. The incidence of only a few hemodynamic side effects may be associated with the use of local anesthetics at low dosages and small volumes. Anatomical, technical, and pharmaceutical factors such as abnormalities of the vertebral spine, traumatic spinal taps, many attempts at needle placement, and the use of antiplatelet and anticoagulant medicine may all contribute to the development of a spinal epidural hematoma [27]. Some of the factors suspected of predisposing patients to epidural hematoma include the use of epidural catheters, simultaneous administration of medications that affect hemostasis, exceeding the recommended dose of enoxaparin, administering enoxaparin to surgical patients prior to the establishment of hemostasis, the presence of vertebral column abnormalities, advanced age, and female gender. Only 1 (0.8%) of the findings showed an epidural hematoma. Epidural anesthesia was found to be the cause of

56 (46.7%) new or worsening post-operative neurologic deficits, and dural puncture was the cause of headaches in 7 (5.8%) cases. In China, a study was conducted. In a study by Kang et al. in 2014, they found that out of 5083 patients, 69 (1.36%) had major complications, including epidural hematoma in 1 patient (0.02%), post-operative neurologic deficits in 57 patients (1.12%), post-dural puncture headache in 7 patients (0.14%), and systemic local anesthetic toxicity in 4 patients (0.08%). Only one patient experienced unilateral lower limb paraesthesia as a persistent sequel [3]. In the US, 0.7% of patients who had a neuraxial anesthesia reported a headache after having their spinal cord punctured. One EBP was administered to 55.7% of patients who had a postural puncture headache, and 10.7% of these patients needed a second EBP. The SCORE Project was not intended to monitor the frequency of accidental epidural needle dural punctures [28].

In China, a survey of 5083 surgical inpatients receiving epidural anesthesia was done. Their mean age was 52.7 ± 17.0 years, and there were 1523 women and 3560 men (70:30) [29]. According to Kang et al. in 2021, 460 (9.05%) patients reported localized pain at the epidural insertion site, while 532 (10.5%) patients reported problems. Other problems included epidural hematoma in 1 patient (0.02%), negative neurological outcomes in 57 patients (1.12%), systemic toxicity of local anesthetics in 4 patients (0.08%), aberrant broad block of the spinal nerve in 3 patients (0.06%), and PDPH in 7 patients (0.14%) [18]. According to Kadhim, 2020, post-spinal puncture headache (PSPH) incidence and intensity in Iraq are substantially correlated with the size of the spinal needle; with narrower needles being linked to a less common and milder form of headache compared to wider diameter needles [30].

Conclusion

According to the results of the current study, there were more male instances than female cases, more than a quarter of them were overweight, and the majority of patients exhibited levels indicative of a lumbar puncture. Epidural anesthesia was the cause of post-operative neurologic deficits in half of them, either new or worsening. Further researches are needed on large scale.

Conflict of interest: None

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