

# Evaluation of Combined Spinal – Epidural Anesthesia in Cesarean Section

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## بی‌حسی توأم اسپاینال – اپیدورال در اعمال جراحی سزارین

### خلاصه

مقدمه: بی‌حسی به روش اسپاینال – اپیدورال توأم به طور شایع در اعمال جراحی سزارین استفاده می‌شود. مزایای این تکنیک شامل شروع سریع و عمیق بی‌حسی اسپاینال به همراه امکان دسترسی به بلوک اپیدورال جهت تداوم بی‌حسی و بی‌دردی می‌باشد. هدف از این مطالعه بررسی بی‌حسی توأم اسپاینال – اپیدورال در اعمال جراحی سزارین بوده است.

روش کار: این مطالعه توصیفی در اعمال جراحی سزارین در سال ۸۴-۱۳۸۳ در بیمارستان امام رضا (ع) انجام شده است. ۵۶ خانم با حاملگی ترم با تکنیک بی‌حسی اسپاینال – اپیدورال که کاندید عمل جراحی سزارین اورژانس یا الکتیو بودند مورد مطالعه قرار گرفتند. تکنیک در وضعیت نشسته انجام شد. سوزن اپیدورال شماره ۱۸ نوع تویی همراه کاتتر، سوزن اسپاینال نوع لانست<sup>۱</sup> شماره ۲۶ استفاده شد.

داروی بی‌حس کننده موضعی بوپی‌واکائین ۰/۵٪ (۱۲ میلی‌گرم) به همراه فنتانیل (۲۵ میکروگرم) به فضای ساب دورال تزریق شده و سطح بی‌حسی در حد T4 مورد نظر بود. مشخصات فردی، نتایج عمل جراحی، میزان سر درد و تهوع بعد از عمل در پرسشنامه جمع آوری گردید. اطلاعات جمع آوری شده با استفاده از آمار توصیفی و جداول توزیع فراوانی پردازش شد.

نتایج: شکست کلی در تکنیک (۱۶/۰۷٪) بود که شامل مواردی بود که نیاز به انجام بیهوشی عمومی شد (۱/۷۸٪)، مواردیکه خروج مایع مغزی نخاعی رویت نشد و نیاز به انجام بی‌حسی از طریق کاتتر اپیدورال بود (۳/۵۷٪)، شکست در امکان تزریق از طریق کاتتر اپیدورال بود (۵/۳۶٪). تغییرات همودینامیک در مادر در ۸۳/۹٪ موارد دیده شد که در ۵۰٪ نیاز به تجویز آفدرین بود، میزان سردرد بعد از سوراخ کردن سخت شامه ۰٪ و میزان تهوع ۴۲/۸٪ بدست آمد.

نتیجه‌گیری: با توجه به نتایج این مطالعه بهتر است بی‌حسی اپی دورال در بیمارانی که جراحی سزارین طولانی برای آنها خطرناک است و یا مواردی که منعی برای بیهوشی عمومی وجود دارد و یا هدف بی‌دردی بعد از عمل باشد، استفاده گردد.

کلمات کلیدی: بی‌حسی مامایی، بی‌حسی اسپاینال – اپیدورال توأم، سردرد بعد از سوراخ کردن سخت شامه

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## Introduction

Standard epidural and spinal blocks are well accepted regional anesthesia techniques, but they have several disadvantages. The CSE<sup>1</sup> technique can reduce or eliminate the risk of these disadvantages (1). CSE block combines the rapidity and reliability of the subarachnoid block with the flexibility of continuous epidural block to extend the duration of analgesia and for this reason it is an effective technique for unexpectedly prolonged operations (1,4). Low-dose spinal anesthesia, when using the needle-through-needle CSE technique, has been suggested by some (5). In severe preeclampsia, the low dose CSE technique provides adequate highly desirable anesthesia with less hypotension (5). However, it has not been clarified whether a lower dose is required for spinal anesthesia using the needle-through-needle technique in comparison with standard anesthesia in cesarean delivery (4). This study was designed to investigate the total failure rate, the incidence of hypotension and PDPH<sup>2</sup> related to CSEA technique in patients undergoing cesarean delivery.

Failure rate for CSEA is 3-5.9% which is higher, compared with standard spinal anesthesia and lower, compared with traditional epidural anesthesia (6,7).

Regional blocks in obstetrics are often performed in sitting position and after local anesthetic injection, the patient position changes to supine. In CSEA technique, there is a delay in assuming the supine position because of epidural catheter placement, which may affect the incidence of hypotension.

The frequency of post-dural puncture headache decreases with decreasing the spinal needle size and is estimated to be at the minimal level with small size spinal needle in CSE (8).

## Material and Methods

This was a descriptive study and done in Imam Reza Hospital during 2004-2005. After achieving hospital ethics committee approval and patient's satisfaction, 56 patients (ASA physical status I-II, body weight 50-95kg), candidates for elective or urgent cesarean delivery received CSEA. Patients with contraindications to regional anesthesia were excluded.

All the patients were prehydrated with 500-1000ml of lactated ringer's solution before induction. Monitoring with noninvasive blood pressure measurement and pulse oximetry was applied.

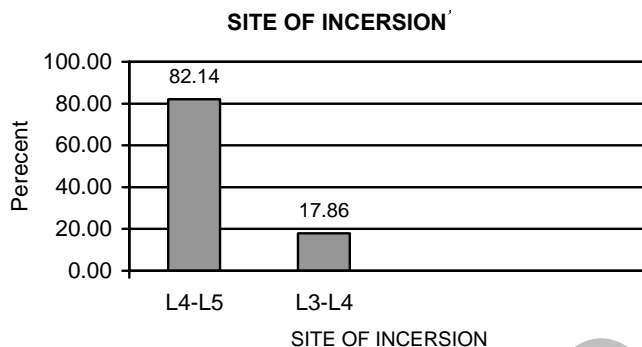
The regional anesthesia was performed, with the patient in sitting position, at the fourth or third lumbar interspace in a midline approach. In all patients a 16-gauge Tuohy needle was introduced into the fourth or third lumbar space and the epidural space was identified by a loss of resistance to air. Using the needle through – needle technique, a 26 gauge whitacre spinal needle was inserted into the subarachnoid space via the epidural needle and after CSF was obtained, 12mg of hyperbaric 0.5% bupivacaine and fentanyl (25µg) were injected. After withdrawal of the spinal needle, a multiorificed catheter was placed 3-4 cm into the epidural space and the epidural needle was removed. Patients were then turned into supine position. Then 2ml of 0.9% saline was injected through the catheter for insuring of catheter patency. Systolic blood pressure, level of sensory block, nausea and headache was recorded. Hypotension (defined as SBP<80mmHg or a reduction in SBP about 20% from baseline) was recorded and if reduction in SBP was more than that, or when the patient was symptomatic (nausea or dispnea) the patient was treated with a boluses dose of 5-10mg epidural. A 24h postoperative review was also conducted in which the occurrence of PDPH<sup>2</sup>.

## Results

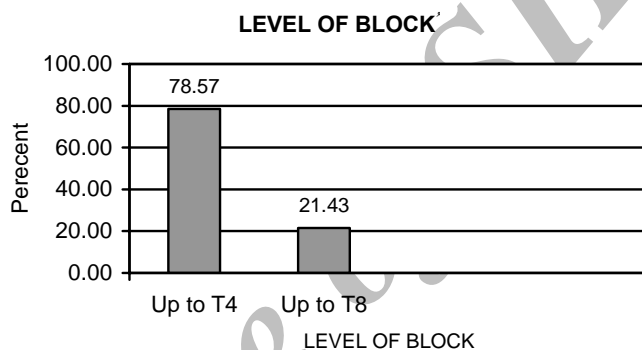
Patients were between 18-42 years old (30.57± 6.44). Blockade characteristics are shown in Figures 1 and 2.

1 -CSE: Combined spinal-epidural

2-PDPH: Post Dural Puncture Headache



**Figure 1: Frequency of site of needle incersion in patients undergone CSEA**



**Figure 2: Frequency of level of block in patients undergone CSEA**

Hemodynamic changes with those requiring treatment (ephedrine),

incidence of PDPH and nausea are presented in table 1.

**Table 1: Frequency of complications in patients who underwent CSEA**

	Frequency ( of 56)	Percent
Hypotension	47	83.9%
Ephedrine administration	28	50.0%
Headache	0	0%
Nausea	24	42.8%

Total failure rate including patients who were anesthetized, those receiving low level of spinal blocks, those with failure in catheter placement, or failure in injection through epidural catheter (replacement or kinking) was presented in table 2.

In one case CSF was not obtained, and epidural catheter placement was not

successful, so we had to use standard spinal anesthesia.

In one case CSF was obtained, epidural catheter placement was not successful, but because of low level of block we had to do general anesthesia.

In two cases CSF was not obtained, but we placed epidural catheters successfully and surgery was done by

epidural anesthesia, thus we had failure in spinal anesthesia. In two cases level of anesthesia was low. Thereby we had to use epidural

catheter for suitable anesthesia. Three epidural catheters were kinked during checking of patency of catheters.

**Table 2: Frequency of failure rate in patients undergone CSEA**

<b>General anesthesia</b>		
Standard spinal anesthesia	1	1.78%
Block was done from epidural catheter	2	3.57%
Increasing level of block by epidural catheter because level of spinal anesthesia was low	2	3.57%
Replacement or kinking of catheter	3	5.36%
<b>Total failure rate</b>	<b>9</b>	<b>16.07%</b>

### Discussion

Soresi reported the use of combined spinal and epidural anesthesia in 1937. This technique has gained popularity since Curelaru combined spinal and epidural anesthesia using an epidural catheter in 1979 (9).

The CSE technique has gained increasing popularity for patients undergoing major surgery below the umbilical level who require prolonged and effective post operative analgesia (10).

In Ranasignhe study total failure rate of CSEA was 5.9% (from 525 cases, 3 patients were given anesthesia, in 14 patients they could not thread an epidural catheter after injecting drug intrathecally, in 13 patients they could not obtain CSF) none of these 38 patients truly received a CSEA and must be considered CSEA failure. Failure rate of standard anesthesia for cesarean delivery is close to zero and is 18.2% in traditional epidural method (7).

In Herbstman study failure to obtain CSF (3-5%) was not significantly different among spinal needle type (11). In Albright's study CSE technique provided decreased failure rates for labor analgesia and comparable or decreased failure rate for surgical anesthesia, when compared with reported failure rates for epidural

anesthesia (12). Eappen in his practice noted that overall epidural catheter failure rate in epidural anesthesia was 13.1% with a dural puncture rate of 1.03% (13). In our study total failure rate was 16.7%.

Regional blocks in obstetrics are often performed with the parturient in the sitting position because the midline may be recognized much easier, than in the lateral decubitus position. When conventional spinal anesthesia is performed, the patient is placed supine immediately after drug injection. In contrast, when CSE is performed, there is a delay in assuming the supine position because of epidural catheter placement, which may affect the incidence of hypotension (6). The frequency of post dural puncture headache decreases with decreasing spinal needle size and is estimated to be 2-12% with a 26 gauge quincke needle and 1.7% with a 27 gauge whitacre needle(8).

In this study incidence of hypotension was 83.9% with 50% of patients needing ephedrine.

Incidence of PDPH in CSE technique is rare (0 – 0.44%)(14). In our study it was 0%.

## Conclusion

The main findings of our study were that though CSEA is so preferred and useful regional anesthetic technique in prolonged operation or in whom the general anesthesia has contraindication, in uncomplicated cesarean delivery, or unexpected prolonged cesarean section, it is not preferred and one should

balance between standard spinal anesthesia and CSEA apply.

## Acknowledgment

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## Abstract

**Introduction:** The combined spinal – epidural anesthesia (CSEA) is commonly used for cesarean delivery. Its advantages include rapid onset and density spinal anesthesia, with flexibility of continuous epidural block to extend duration of anesthesia and analgesia. The main aim in our study is evaluation of this technique in cesarean section in Imam Reza Hospital.

**Material and Methods:** This descriptive study was done in Imam Reza Hospital in 2004-2005. 56 women, at term of pregnancy, about to undergo an elective or urgent surgery under CSEA were studied. All parturients were hydrated preinduction. The technique was performed at sitting position. Design included a 18G Touhy epidural needle and a 26G Whitacre lancet point spinal needle. Local anesthetic was hyperbaric bupivacaine 0.5% (12mg) with fentanyl (25µg) intratech and a T4 sensory block was targeted. Total failure rate, maternal hemodynamic changes and ephedrin requirement, PDPH and nausea were evaluated.

**Results:** Total failure rate was 16.07% including a need for general anesthesia (1.78%), cases in whom we could not obtain CSF (3.57%), the block through epidural catheter and failure rate in epidural catheter supplementation (3.57%). Maternal hemodynamic changes (83.9%), ephedrin requirement PDPH and nausea frequency were 83.9%, 50%, 0%, 42.8% respectively.

**Conclusion:** in attention to these result, we believe that it is better to use CSEA in cesarean section surgeries only when there is a risk for long operation or when general anesthesia is high risk or as a postoperative analgesia.

**Keyword:** Obstetrics Anesthesia, Combined Spinal-Epidural Anesthesia, Post Dural Puncture Headache

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