



## Evaluation of the Effect of Pregestational and Gestational Body Mass Index on Skin Puncture Pain During Spinal Anesthesia for Elective Cesarean Operation

### Pre-gestasyonel ve Gestasyonel Periyottaki Vücut Kitle Endeksinin Elektif Sezaryen Operasyonu İçin Spinal Anestezi Sırasında Cilde İğne Giriş Ağrısına Etkisinin Değerlendirilmesi

Hatice TOPRAK<sup>1</sup>, Mehmet SARGIN<sup>2</sup>

<sup>1</sup>Sağlık Bilimleri Üniversitesi, Konya Eğitim ve Araştırma Hastanesi, Anesteziyoloji ve Reanimasyon Kliniği, Konya, Türkiye.

<sup>2</sup>Selçuk Üniversitesi Tıp Fakültesi, Anesteziyoloji ve Reanimasyon Anabilim Dalı, Konya, Türkiye.

#### Abstract

**Objective:** Skin puncture pain during spinal anesthesia is the reason of wincing from spinal anesthesia in many patients. In this study we aimed to investigate whether the body mass index in the pregestational and gestational period affects skin puncture pain during spinal anesthesia for cesarean sections.

**Material-Method:** One hundred pregnant scheduled to undergo elective caesarean section under spinal anesthesia, were studied. Spinal anesthesia was induced with hyperbaric bupivacaine 10-15 mg via a 27G Quincke spinal needle in the sitting position at the L3-4 or L4-5 vertebral level using median approaches. Skin puncture pain during spinal anesthesia were assessed on a scale of 0 to 10, where 0 means no pain and 10 the worst possible pain.

**Results:** There were no correlation between gestational BMI and the skin puncture pain VAS scores was found ( $\rho=-0.021$ ,  $p=0.835$ ). And also no correlation between pre-pregnancy BMI and the skin puncture pain VAS scores was found ( $\rho=-0.012$ ,  $p=0.903$ ).

**Conclusions:** We believe that the pregestational and gestational body mass index does not have any effect on skin puncture pain during spinal anesthesia.

**Keywords:** Spinal Anesthesia, Skin Puncture Pain, Body Mass Index

#### Özet

**Amaç:** Spinal anestezi sırasındaki cilde iğne giriş ağrısı, pek çok hastada spinal anesteziye cayma sebebidir. Bu çalışmada, pregestasyonel ve gestasyonel vücut kitle endeksinin gebelerde sezaryenleri için uygulanan spinal anestezi sırasında cilde iğne giriş ağrısını etkileyip etkilemediğini araştırmayı amaçladık.

**Materyal-Method:** Spinal anestezi altında elektif sezaryen geçirecek 100 gebe çalışmaya dahil edildi. Spinal anestezi, median yaklaşım kullanılarak L3-4 veya L4-5 vertebra seviyesinde oturma pozisyonunda 27G Quincke spinal iğne ile hiperbarik bupivakain 10-15 mg ile gerçekleştirildi. Spinal anestezi sırasındaki cilde iğne giriş ağrısı, 0 ile 10 arasında bir ölçekte değerlendirildi; buradaki 0, ağrı ve 10 olası en kötü ağrı anlamına gelmektedir.

**Bulgular:** Gestasyonel vücut kitle endeksi ile cilde iğne giriş ağrısı VAS skorları arasında bir ilişki bulunmadı ( $\rho=-0,021$ ,  $p=0,835$ ). Ayrıca gebelik öncesi vücut kitle endeksi ile cilde iğne giriş ağrısı VAS skorları arasında da bir korelasyon bulunmadı ( $\rho=-0,012$ ,  $p=0,903$ ).

**Sonuç:** Pregestasyonel ve gestasyonel vücut kitle endeksinin spinal anestezi sırasında cilde iğne giriş ağrısına herhangi bir etkisinin bulunmadığı kanaatindeyiz.

**Anahtar kelimeler:** Spinal Anestezi, Cilde İğne Giriş Ağrısı, Vücut Kitle Endeksi

#### Introduction

Spinal anesthesia is a simple and reliable method of anesthetizing lower part body. Spinal anesthesia is frequently preferred in obstetric surgery. Our clinic is preferred at very high rates because of its many advantages such as less effect on both mother and baby physiology and better analgesia in the postoperative period. However many people refuse it because of fear of skin puncture pain. Spinal needle puncture pain has both somatic and psychological component (1).

Spinal anesthesia in obese patients is associated with

increased risk of technical difficulty and anaesthetic failure (2). No studies have been found in the literature on the relationship between needle penetration pain and obesity in spinal anesthesia.

Several methods can be applied to reduce skin puncture pain. Noninvasive creams containing local anesthetics, patches and local anesthesia infiltration (3).

In our study, we aimed to investigate whether the body mass index in the pregestational and gestational period affects skin puncture pain during spinal anesthesia for cesarean sections.

## Material-Method

The study was performed in Health Sciences University Konya Education Research Hospital. The study was approved by the Ethics Committee for Clinical Investigations of Necmettin Erbakan University Meram medicine faculty (Decision date: 17.03.2017 and number: 2017-857)

American Society of Anesthesiology physical status Class I-II was included in the study of 100 pregnant between 18-40 years of age, who underwent elective cesarean operation and accepted spinal anesthesia. Pregnant women having problems in communication, any contraindications to spinal anesthesia whose spinal puncture could not be performed in the first attempt were excluded.

The spinal anesthesia was applied to the patients who agreed to participate in the study in accordance with the above purpose and scope. During the spinal anesthesia procedure, he was reminded that he would be asked about the pain he had when the needle entered the skin, and was asked after the procedure. Pre-gestational and gestational height and weight were recorded before spinal anesthesia. Patients' BMI values calculated. Spinal anesthesia was performed by the same anesthetist in all patients using the median approach through L3-L4 or L4-5 intervertebral space. A Quincke 27-gauge spinal needle (Egemen International İzmir / TURKEY) was used.

The lumbar puncture pain was assessed by Visual Analog Scale (VAS) score (0-10); where 0 is no pain and 10 is the worst imaginable pain.

Pre-gestational and gestational height and weight were recorded before spinal anesthesia. Pre-gestational and gestational period BMI calculations were evaluated separately in all patients.

## Statistical Analysis

Statistical analyses were performed with SPSS 15.0 software (SPSS Institute, Chicago, IL, USA). Continuous data were tested for normality. Normally distributed data were summarized using mean and skewed data were summarized using median (range). The association between gestational/pre-pregnancy BMI and the skin puncture pain VAS scores was assessed by Spearman correlation coefficient. A P-value less than 0.05 was considered statistically significant.

## Results

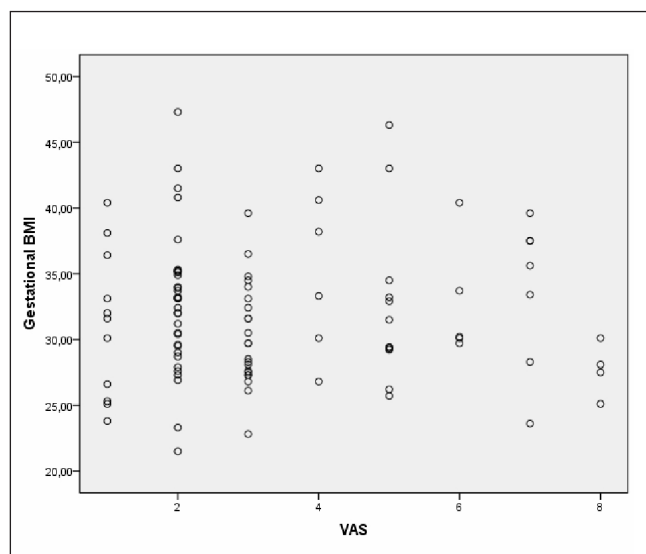
All patients successfully completed the study. Patients' demographics are summarized in Table 1. Mean (SD) age of participants was 30.01 (5.40). Mean (SD) gestational and pre-pregnancy BMI were 32.03 (5.24) and 27.06 (5.47), respectively. And median gestational age was 39 week. Only 4 of the participants were smoking.

No correlation between gestational BMI and the skin puncture pain VAS scores was found ( $\rho = -0.021$ ,  $p = 0.835$ ) (Figure 1). And also no correlation between pre-pregnancy BMI and the skin puncture pain VAS scores was found ( $\rho = -0.012$ ,  $p = 0.903$ ) (Figure 2).

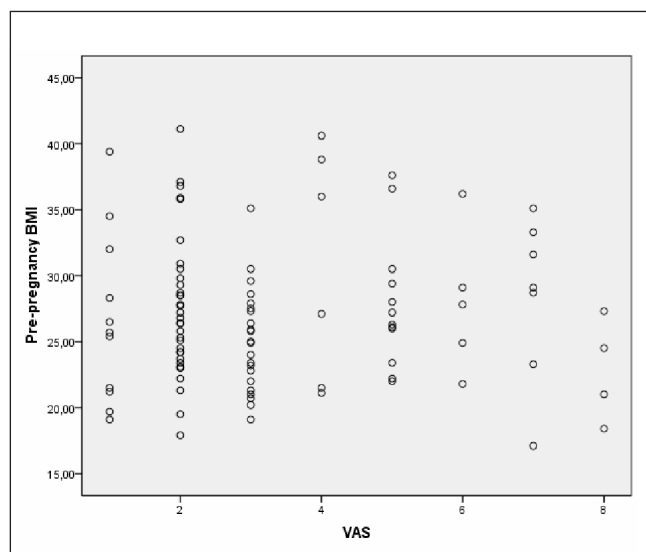
**Table 1.** Patients' characteristics

	(n=100)
Age, year	30.01±5.40
Pre-pregnancy BMI, kg/m <sup>2</sup>	27.06 ± 5.47
Gestational BMI, kg/m <sup>2</sup>	32.03 ± 5.24
Gestational age, week	39 (28-42)
Smoking, n	4
VAS	3 (1-8)

ASA: American Society of Anesthesiologists. Data presented as mean ± SD (normally distributed data), median (range) (skewed data) or number.



**Figure 1.** Spearman's correlation coefficient between gestational BMI and the skin puncture pain VAS scores



**Figure 2.** Spearman's correlation coefficient between pre-pregnancy BMI and the skin puncture pain VAS scores

## Discussion

We found that there were no effect of pregestational and gestational peritoneal body mass index on acute needle penetration pain during spinal anesthesia for elective cesarean operation.

Obesity is an important health problem that is increasing in prevalence in recent years. Body mass index (BMI) 25-29.9 kg/m<sup>2</sup> by the World Health Organization is overweight, 30-39.9 kg/m<sup>2</sup> is obese, 40 kg/m<sup>2</sup> is defined as morbid obese (4). There was a positive correlation between the increase in body mass index and pain experience in various studies. (5, 6, 7).

We are known that obesity is directly related to an increased need for caesarean delivery. Skin puncture during spinal anesthesia can even cause patients to refuse spinal anesthesia due to pain and stress. Both the fear of needles and the pain of the skin puncture may cause both physical and psychological problems to the patient (8). Therefore, various methods have been tried to alleviate skin puncture pain during spinal anesthesia (1, 9, 3). Pharmacological methods are the most popular among these methods. However, studies investigating the relationship between patient characteristics and skin puncture pain are not available in the literature. It is known that women respond to painful stimuli about the characteristics of patients with pain with higher pain scores than men (10), however, in our study, all of our patients are more vulnerable than pregnancies.

The application of iv opioid, local anesthetic application to the puncture area, local anesthetic application under the skin is frequently performed from pharmacological methods (9, 11).

Kumar et al. planned to evaluate efficacy of Valsalva maneuver to address both physiological and psychological aspect of skin puncture pain felt during spinal anesthesia (3). Valsalva group has shown significant reduction in incidence and severity of spinal puncture pain as compared to control group. According to these results Valsalva maneuver can be performed routinely in patients undergoing spinal anesthesia as it is safe, painless and non pharmacological method. Another study assessed the effect of pain in the spinal needle insertion Valsalva maneuver, was demonstrated similar results to the results of Kumar et al. (1).

In conclusion, we think that pre-gestational and gestational BMI are not influenced on the skin puncture pain in patients who undergo elective cesarean section with spinal anesthesia.

## References

1. Mohammadi SS, Pajand AG, Shoeibi G. Efficacy of the Valsalva maneuver on needle projection pain and hemodynamic responses during spinal puncture. *Int J Med Sci.* 2011 Feb 16; 8(2): 156-60.
2. Bamgbade OA, Khalaf WM, Ajai O, Sharma R, Chidambaram V, Madhavan G. Obstetric anaesthesia outcome in obese and non-obese parturients undergoing caesarean delivery: an observational study. *Int J Obstet Anesth.* 2009 Jul; 18(3): 221-5.
3. Kumar S, Gautam SK, Gupta D, Agarwal A, Dhirraj S, Khuba S. The effect of Valsalva maneuver in attenuating skin puncture pain during spinal anesthesia: a randomized controlled trial. *Korean J Anesthesiol.* 2016 Feb; 69(1): 27-31.
4. Gökçal E, Tamer S, Kiremitçi Ö. Migrenli Kadınlarda Vücut Kitle İndeksinin Ağrı, Özürlülük ve Uyku Üzerine Etkileri. *Van Tıp Dergisi:* 22(2): 84-89, 2015.
5. Hitt HC, McMillen RC, Thornton-Neaves T, Koch K, Cosby AG. Comorbidity of obesity and pain in a general population: results from the Southern Pain Prevalence Study. *J Pain.* 2007 May; 8(5):430-6.
6. Somers TJ, Wren AA, Keefe FJ. Understanding chronic pain in older adults: abdominal fat is where it is at. *Pain.* 2011 Jan; 152(1):8-9.
7. McVinnie DS. Obesity and pain. *Br J Pain.* 2013 Nov; 7(4):163-70.
8. Gupta D, Agrawal A, Dhiraaj S, Tandon M, Kumar M, Singh RS, et al. An evaluation of balloon inflation on venous cannulation pain in children: a prospective, randomized, controlled study. *Anesth Analg* 2006; 102: 1372-5.
9. Sharma SK, Gajraj NM, Sidawi JE, Lowe K. EMLA cream effectively reduces the pain of spinal needle insertion. *Reg Anesth.* 1996; 21:561-564.
10. Gursoy A, Ertugrul DT, Sahin M, Tutuncu NB, Demirer AN, Demirag NG. The analgesic efficacy of lidocaine/prilocaine (EMLA) cream during fine-needle aspiration biopsy of thyroid nodules. *Clin Endocrinol (Oxf).* 2007; 66:691-694.
11. Koscielniak-Nielsen Z, Hesselbjerg L, Brushøj J, Jensen MB, Pedersen HS. EMLA patch for spinal puncture. A comparison of EMLA patch with lignocaine infiltration and placebo patch. *Anaesthesia.* 1998; 53:1218-1222.