

DECEPTIVE LEVEL AFTER INTRATHECAL BLOCK FOR CESAREAN SECTION IN A PATIENT WITH PRIOR ABDOMINOPLASTY

A Case Report

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Abstract

Abdominoplasty is performed in an increasing number of patients, both male and female.. The removal and hence rearrangement of abdominal skin may make assessment of the dermatome level of a subarachnoid block difficult. Also patients may hesitate, or even forget, to reveal cosmetic surgeries during the preanesthetic interview. Therefore it is important to maintain a high index of suspicion in patients who have had bariatric surgery. In this report we present the case of a deceptive anesthetic level in a parturient with an undisclosed history of abdominoplasty who presented for Cesarean section.

Introduction

In 1898, August Bier performed the first planned spinal anesthetic using cocaine to a 34 year-old laborer¹. Neuraxial anesthesia for labor and delivery has progressed greatly since then and is now considered the standard of care for pain relief. However, accurate block level assessment continues to be a challenge. Cold, pinprick, and touch discrimination are conventionally used to determine the level of sensory block during spinal anesthesia. These tests have the advantages of being simple, repeatable, generally reproducible and applicable. Yet, their ability to accurately predict surgical anesthesia has been questioned. Furthermore, patient factors can contribute to the inaccuracy of these test results despite appropriate test administration by the clinician.

It is widely accepted that sensory block to the T4/T5 dermatome level is needed to provide adequate anesthesia for Cesarean section². A block at this level is essential to provide adequate surgical anesthesia to include the visceral organs such as the uterus and the majority of the peritoneum. Identifying clinical situations that may lead to false test results and an understanding of the difference in testing modalities, can improve the accuracy of anesthetic level assessment.

Case Description

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A 32 year-old primipara presented for elective Cesarean section for breech presentation. Her past medical history included gastric bypass surgery that was performed 6 years prior resulting in a 42-kg weight loss. The patient denied any other medical or surgical history. After attachment of standard monitors, the patient was placed in the sitting position. A spinal anesthetic was performed at the L2-L3 level, using a 27g Whitacre needle. After confirmation of needle tip position by observation of cerebrospinal fluid flow, hyperbaric bupivacaine 0.75% 1.5 ml and preservative-free morphine 0.25 mg were administered intrathecally. The patient was then immediately placed in the supine position with left uterine displacement. Mild hypotension was treated with ephedrine. Anesthetic level assessment was tested by pinprick and measured at the T11 dermatome level bilaterally. The patient was then placed in slight Trendelenberg position to facilitate the spread of local anesthetic. Reassessment several minutes later indicated no rise in dermatome block level. Upon close physical examination of the patient's abdomen, scarring suggestive of abdominoplasty was noted and the patient was questioned again regarding her surgical history. Though not otherwise noted in the medical record or discussed during the initial pre-operative assessment, the patient admitted that she had undergone extensive plastic surgery after her gastric bypass operation 5 years previously. She had failed to mention it earlier because she did not think that plastic surgery counted as "real" surgery. With this information, we again attempted to determine the level of anesthetic using the pinprick technique, testing posterolaterally beyond the area of abdominoplasty and appreciated a block level at T5.

The patient retained sensation to the anterior abdominal skin that had been pulled down low across her abdomen during the abdominoplasty but which corresponded to higher level dermatomes not reached by the spinal anesthesia. Realizing that administering more drugs intrathecally might result in cardiorespiratory compromise, we asked the obstetricians to use local anesthesia to eliminate sensation to this area or make the incision below the abdominal scar. The surgeons chose to incise below the abdominal scar in the area of skin corresponding to the original dermatomal anatomy where the spinal anesthesia had effectively rendered the patient insensate. An uneventful operation was performed. The patient did not report any unusual painful sensations throughout the course of delivery, indicating good visceral block.

Discussion

The most common modalities used to assess the spread of spinal anesthesia are cold, sharp pinprick and light touch. There is a wide variability between methods of assessing the level of the block, the reproducibility of these methods between clinicians, and the modality used. The issue is further complicated by the fact that there is no constant relationship between the levels assessed by these three sensory modalities. For example, Russell et al³ pointed out that the dermatome level at which sensitivity to cold is lost is usually higher than that of loss of sensation to pinprick, which in turn is higher than that of loss of sensation to light touch following spinal anesthesia. Additionally, loss of sensation to cold occurs before pinprick, and both of these are lost before loss of sensation to light touch is appreciated, as each stimulus is carried by different fibers (C, Ad and Ab fibers respectively)⁴. Many studies have used a level of block to pinprick at T4 to indicate adequate anesthesia for Caesarean section²⁻⁴. However, results of these investigations indicate that pinprick to T4 is unreliable in predicting the adequacy of spinal anesthesia for Cesarean section^{3,4}. As such, experienced clinicians may use very little formal testing, relying on other signs such as early onset of lower limb weakness, feelings of warmth, slight hypotension and altered sensation over the proposed site of surgery as a means of block assessment.

Several investigators indicate that the loss of touch sensation is the best predictor of painless surgery, as compared to the loss of cold and pinprick^{3,6}. This may be a reasonable alternative to the use of pinprick or cold despite the more subtle and subjective nature of such a test. Moreover, the associated noxious stimulus and potential for introducing infection involved with pinprick puts the touch modality at a clear advantage. Because of these differences, an apparently “adequate” spinal placement may not actually provide surgical anesthesia because the block has been tested using a stimulus of significantly different modality or intensity than the planned surgery³.

Pain during surgery can occur despite altered sensation over the surgical site for several reasons. A simple, single stimulus (e.g. pinprick, cold) may be blocked, but only accurately tests responses to that stimulus in the local area. Surgery involves multiple forms of afferent stimulation and spinal cord mechanisms may result in repeated stimuli (temporal summation), or stimuli from adjacent regions (spatial summation), evoking pain and leading to a “failed block” and poor image for the anesthesiologist⁴.

In this case, the patient’s prior abdominoplasty resulted in a downward shift of dermatomes of the anterior abdomen. Thus, the use of pinprick to assess the anesthetic level gave the false perception of an inadequate block. Having understood the consequences of an abdominoplasty and its effect on the dermatomal anatomy, a pinprick test on the posterolateral aspect of the patient’s abdomen was performed. Our suspicions were confirmed and the patient displayed a block at the T5 level. Despite correct administration of the test, as in this case, one could have easily been misled to think that the spinal block was inadequate. This underscores the importance of a fundamental knowledge of anatomy applied to the anesthetic principles of a neuraxial block. While visceral blockade was sufficient for the planned surgery, skin sensation remained intact.

Conclusion

Abdominoplasty is common after weight loss surgery. These procedures are performed as anterior and/or circumferential abdominoplasty or tioroplasty, a surgery that involves removal of excess skin of the trunk in addition to abdominal skin, making accurate level assessment of subarachnoid block virtually impossible because of dermatome changes. Often patients do not report cosmetic procedures when recounting a surgical history and plastic repairs may make incisions difficult to identify. A high index of suspicion should be maintained in patients with retained anterior skin sensation after uneventful placement of a subarachnoid block, especially if there is a history of weight loss surgery with considerable positive results. Until additional methods of assessing spinal block levels are developed that are practical, accurate and easily reproducible, maximizing the accuracy of the current methods can be achieved by understanding their differences and limitations. The use of the light touch modality may be more appropriate in the clinical setting given the poorer predictive power of cold and sharp pinprick tests.

While we report on a case of Cesarean section, males also frequently undergo weight loss surgery with plastic repair at a later date. They may also present for abdominal or urologic surgery that is managed by neuraxial block. Again, a level of suspicion should be maintained.

References

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