



Approach to failed spinal anaesthesia for caesarean section

Mojgan Rahimi¹

1-Department of Anesthesiology and Intensive Care, Imam Khomeini Hospital Complex, School of Medicine, Tehran University of Medical Sciences, Tehran, Iran.

Afzal Shamsi^{2,3}

2-Anesthetics Group, School of Allied Medicine, Tehran University of Medical Sciences, Tehran, Iran.
3-Nursing and Midwifery Care Research Center Tehran University of Medical Sciences, Tehran, Iran

Negar Eftekhari¹

1-Department of Anesthesiology and Intensive Care, Imam Khomeini Hospital Complex, School of Medicine, Tehran University of Medical Sciences, Tehran, Iran.

Hyder Jaber AL-Qgaili^{3*}

3-Nursing and Midwifery Care Research Center Tehran University of Medical Sciences, Tehran, Iran

ABSTRACT

Background: Failure of spinal anesthesia for a cesarean section (C-Section) may have both maternal and neonatal deleterious sequel, Contrivances of spinal anesthesia failure in addition to the “approach to a failed block” have been discussed in this article.

Methods: Literatures were reviewed in Cochrane databases, PubMed, and Google Scholar for articles regarding caesarean section and failed spinal block.

Results: Approaches to failed spinal anesthetic (SA) involve: riggers to retrieve the block, repetitive blocking, “epidural anesthesia (EA)” or a “combined spinal-epidural (CSE)” procedure, or makeshift to “general anesthesia (GA)”. The factors affecting the decision among these alternatives have been discussed.

Conclusion: A “failed spinal algorithm” can escort the anaesthesiologist thus eliminate both mortality and morbidity.

Keywords:

Caesarean section, failed spinal, general anesthesia, repeat spinal, safe practice

Introduction

Physiological alterations during pregnancy, involving respiratory, “cardiovascular”, and hematological variations, all escalate the ventures in the course of C-Sections, and management of parturient anesthetic, is a challenge since it requires consecutive care for both baby and mother [1]. These threats and sophistications are associated with the degree of necessity [2]. The proficiency of the plurality of anesthetists with GA in obstetrics is

precisely minimal. GA is comonly performed for urgent C-Section due to the factor of time inflicted by the status of the fetus which generally hinders local anesthesia [3]. Technically, the “epidural block” in “epidural anesthesia (EA)” is mor difficult than the application of a spinal anesthetic (SA), and the inception of action of spinal anesthesia is sooner and delivers consistent operating anesthesia from the sacrum to the mid-thoracic level with less than 1% failure rate. Moreover,

SA was proven cost-effective and result in better anesthesia for unsophisticated, optional C-Sections than EA [4]. C-Section is a extensively implemented operations with maternal mortality frequency extremely more than vaginal birth, in addition the pulmonary thromboembolism preeclampsia complications, cardiac disease, obstetric bleeding, and amniotic fluid embolism was found the main reasons for death [5]. For caesarean section both general anaesthesia and spinal and epidural anaesthesia are applicable. Although the preferred technique is epidural and spinal anaesthesia in the second degree, due to the time-consuming epidural technique and the possibility of incomplete block in this method, most cases of caesarean section with spinal anaesthesia, are done. In case of fetal distress and the need for rapid caesarean section, as well as in cases where it is used Contraindicated in regional anaesthesia, general anaesthesia is used. In all anaesthesia and caesarean techniques for caesarean section, prior preparation includes fasting for 6 to 4 hours, use of H2 receptor antagonist such as intravenous ranitidine, and administration of particle-less antacids (30 ml sodium citrate half an hour before surgery). Orally and intravenously with metoclopramide before surgery to eliminate the pulmonary aspiration risk [6].

All of the discussed techniques used for eliminating the chance of failure requires close essence concern to detail. The strategy for control improper block include reinjection, boosting with local aesthetic infiltration by the surgeon, manoeuvring the posture of the patient to ensure the broader spread of the solution injected, giving of analgesic therapies or systemic sedation, and eventually shift to GA. Follow-up practises should involve detailed events recording, the patient must be notified with detailed explanation of what is happening and he must be fully aware of all the details related to the failur even when shift to GA [7].

It is conceivable that following of "systematic algorithmic approach" to handle of "inadequate spinal anaesthesia" that have such broad categories tell diminutive about the huge comprehensive techniques where an

intrathecal injection can go deviated within every of the individual spinal anaesthetic five phases, these phases are: lumbar puncture, injection of solution, drug spread through CSF, action of the drug on the cord and roots of the spinal nerve, and subsequent management of the patient, subsequently. All of the impairments included are properly covered in the literature, but historically, and many practitioners seem oblivious of these possible concerns. Take into consideration of these concerns decreased the necessity to shift to GA, whether the shift had been urgent, it would have ascertained of less hazard. Majority of skilled anaesthetists would esteem the failure incidence with SA to be as minimum as 1%. Though, the incidence has been determined 17% by the "American teaching hospital", however the majority of the failures were considered likely 'avertable' [8]. Data from another institution represented this high rate 'unacceptable', and detrmined ratio of 4%, with the "judgment errors" as the main effector, but still regarded 17% significant,. Its obviously that careful consideration to details is a vital. and the 1% failure frequency is possible in daily work [9]. It is important to eliminate the failure incidence to optimize and benafit of spinal aesthesia. The first step in the prevention begins with identification of the probable consequences in order to clinical workflow can be adapted to evad of them. Hence the present study to be evaluated the effects of using spinal anaesthesia in caesarean section (eleminating the failure incidence is clearly a criterion for getting benefit of SA, and the control must begins with compleet identification of the probable consequences so that clinical workflow can be tailored to their evasion).

Material and Method:

Study design will be a narrative review of medical databases articles in the Scopus, Embase, PubMed, Web of Science, and hand searched journals and conference proceedings. Articles for this study have been recruited using the inclusion and exclusion criteria in the various medical databases such as Embase, Scopus, Pubmed, Web of Science, Google scholar, abstracts, textbooks, in addition to

unpublished articles that meet the criteria. Randomized controlled trial articles: Prospective double-blind study, Cross-sectional Observational studies, Published and unpublished articles in English, all systematic review articles, all published or unpublished articles before 2010, and all non-english written articles. Variables: Consequences, predictors, and confounding factors in this study are: Prevention, Management, Post Dural Puncture, Gender, Type of surgery, and Type of anesthetic procedure. Finally, study data using descriptive statistics mean difference test for independent groups, frequency (percentage), mean \pm standard deviation, and and "chi-square" or "Fisher's exact test" to qualitatively compare variables among the two groups using SPSS case software Statistical analysis was performed, statistically significant P value was considered less than 0.5, and the effective factors was examined following logistic regression model if necessary.

Results:

In this study a literature search for review and original articles related to failed spinal anesthesia and C-Section in Google Scholar, Cochrane databases, and PubMed. Saving Mothers Report (SMR) [10] evaluated in South Africa, deaths of 92 parturient, between 2008 to 2010. SMR analysis revealed that 73 (79%) of mortalities be consoled to spinal anesthesia. Out of the spinal anasthesia mortalities, 10 (13.6%) of mortalities be consoled to the complicated administration of ensuing GA when inadequate proved SA for surgery. Low clinical expertise together with the improper approach to failure was the reason of maternal mortality. Because there are very limited alternatives for failure approach, ultimate attention is warranted while carrying out spinal anesthesia in order for minimizing both maternal or fetal complications as well as failure rate. The failure rate can be minimised to as low as 1% when the technique been performed carefully, though a variety of studies have estimated the failure rates up to 17%.

Gaston Labat, As early as 1922, quoted that "Two conditions are, absolutely necessary to produce spinal anesthesia; Puncture of the dura mater and Subarachnoid injection of an

anesthetic agent" [11], [12]. Disability to attain these couple of crucial aims in response to whichever reason results in failure of SA. The failure might be, or equipment, technical, or operator related (Table 1). Precise consideration to the subsequent points will facilitate eleminating the possibilty of SA-failure.

Table 1: Mechanism leads to failure

Operator related failure
Inadequate drug dose or volume
Improper assessment of block
Inappropriate positioning
Failure to counsel and communicate
Seniority and personal experience
Technique related failure
Faulty technique
Difficult back (anatomical deformities)
Obesity
Misplaced injection
Pseudo puncture
Equipment or drug related failure
Blocked needle
Use of pencil point needles
Drug potency
Wrong drug
Drug resistance

The failure can be defined as "failure to provide satisfactory surgical conditions and/or maternal comfort and satisfaction during C-Section with or without conversion to GA". Clinically, the failure may rated from failure to absence of any block, despite a appropriate block. There could be a diminished both motor and/or sensory block or a perfect motor-sensory block with unsuitable "cephalad spread", for "surgical anesthesia". Unilateral block might been encountered either due to the positioning or anatomical barrier formed by the "longitudinal ligament" preventing the homogenous spread. Inappropriate or incompletely mislaid dose might leads to "patchy block" or decreased period of block causing block failure to cover the extent of surgery.

Failure of a SA is related to serious psychological, medico-legal, and clinical concerns, particularly when the failure clarified

after the start of operation. UK Royal College of Anesthetists, suggests the frequency of conversion from SA to GA should be less than 1% by choice and less than 3% in emergency cases [12]. Whereas managing an improper block, one necessarily keep quiet and seems to be in complete regulation. Repeated testing might elevate the uncomforness and result in loss of responsiveness. Block salvage must be the main concern to evade GA to the furthest extent. If the parturient protests of pain after the start of operation, it must be halted directly. Additional actions including encouraging the patient, evaluating the type of failure, and trying to maximize the comfort with the best available alternative under the conditions.

Table 2: Various strategies to manage a failed spinal anastheasia throughout C-Section.

Situation	Option	Clinical
R	Repeat block	Non-urgent Caesarean section Total or partial failure Difficult airway or inadequate starvation
R	Revive block	Urgent, Category 1 Caesarean section Skin is already incised Technically difficult spinal
R	Recourse to general an aesthesia	Revival fails No time to repeat the block Patient request

Discussion:

The principal aspects to respect though management of failure are: the first, when the skin had been incisioned, the second, The urgency of the child's birth. Anesthesiologist-Obstetrician coordination is vital for choosing the safest anesthesia option for parturient [13]. On the other hand, secondary aspects to be respected whilst selecting the proprer choice for managing the failure are: difficult airway, starvation status, simplicity of carrying out regional block, and the parturient comorbid situation [14]. A simple algorithm described

must be obeyed to select the optimal option under the circumstances.

When the failure tacksplace before the skin to be incisioned, and delivery can be delayed up to or more than half an hour, then repeating regional block is the best decision for the parturient. When the failure tacksplace before a skin to be incisioned and the delivery is urgent with in less than half an hour, a rapid evaluation of the condition is required. If spinal block easy to perform and the patient is collaborative, rapid endeavor at repeating a spinal block can be respected. When it is not effective, attempt to recover block whereas preparing for shift to general anesthesia devoiding of any additional deferral. Avoid conceding the safety of the mother or fetus. When the failure tacksplace after a skin to be incisioned and the deliver is no urgen with in less than less than half an hour, recover block following other possible options compatible to the conditions. However, endeavor must be done to evad general anesthesia, particularly in the expected difficult airpassages, it is considered the last choice to safely continue operation without any additional delay in case of incised skin. In such condition, a conclusion must be made for an anesthesia option before incision of the uterine. When a post skin incision failure and the deliver is urgent with in less than half an hour, shift to GA is the optimal choice for maternal and fetal safety.

Conclusion

The guidelines for effective spinal anesthesia is "correct drug, correct dose, correct place." The failour of spinal anesthesia is related with the maternal significant mortality and morbidity. Extreme care must be taken to prevent failour, as there are a limited alternatives to salvage the block. In case of failour, priority should be given to rescuing the block avoiding rapid switching to general anasthesia. Selection of unsuitable strategy or extensive utilization of general sedation and analgesia to manage failure possibly endangers the safety of parturient. Although disputes, a very good option is to iterat "intrathecal injection" by expert anesthesiologist under attentiveness. A "failed spinal algorithm" directs the anesthesiologist to manage failures, eliminates

morbidity as well as mortality for both maternal and fetal, and addresses pursuant litigation.

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Conflict of interest

The authors declare that they have no conflicts of interest

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Acknowledgements and Reference heading should be left justified, bold, with the first letter capitalized but have no numbers. Text below continues as normal.

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