ORIGINAL ARTICLE

To determine the frequency of failed spinal anaesthesia during cesarean section

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Abstract

Objective: To determine the frequency of failed spinal anesthesia during cesarean section.

Material and Methods: This cross sectional study was conducted in Department of Anaesthesia, Khyber Teaching Hospital, Peshawar from January 2016 to December 2017. A total of 241-women were observed. 0.5% Bupivacaine with dose ranging from 1.8 to 2 ml were injected by lumbar punctures using a midline approach at L⅔, L¾ or L4/5. The level of spinal block was assessed with ice use by loss of cold and touch perception. After determination of the height of sensory block, the surgeon observed for pain sensation using the non-tooth forceps to pinch the skin at the site of the incision. Those women experience pain after 10-min of administering spinal anaesthesia was classified as failed spinal anaesthesia.

Results: The over all mean age was 30±10.23 years. 32% patients had ASA grade-I and 68% patients had ASA grade-II. 25% patients had emergency caesarean section while 75% patients had elective caesarean section. 14(6%) patients had failed spinal anesthesia while 227(94%) patients didn't had failed spinal anesthesia.

Conclusion: Our study concludes that the frequency of failed spinal anesthesia was 6% during cesarean section.

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Introduction:

Globally, there is an increasing caesarean section rate, and spinal anaesthesia is the anaesthetic of choice for this operative procedure.[1] In different countries, the c mm aesarean section rate increased by 6.3% between 2001 and 2009 with spinal anaesthesia being the most common method of anaesthesia in district and regional hospitals.[2]

Previous studies have shown the safety of this method over general anaesthesia but spinal anaesthesia is not without complications. One disadvantage of spinal anaesthesia is the possibility of failed spinal block. Failed spinal anaesthesia (FSA) is defined as partial or incomplete spinal block requiring supplemental analgesia or conversion to general anaesthesia.[3]

Technical errors are most common causes of failure like drug deposition at lower spinal level then the surgical site, failure to recognize dural puncture, concentration error, and loss of potency by prolong exposure to light etc.[4]

In 2008 a prospective audit of regional anesthesia failure by S. M. Kinsella in 5080-cesarean section showing a rate of conversion of regional anesthesia to general anesthesia was found to be 0.8% for elective and 4.9% for emergency caesarean section.[5] Similar studies conducted in Nepal in 2009 by Shrestha and in Nigeria in 2011 by Adenekan A.T. shows failure rate of 4.3% and 6% respectively.[6,7] In Singapore spinal anesthesia using low dose of hyperbaric bupivacaine with narcotic analgesia was used for elective cesarean section showing a failure rate of 0.5% necessitating the use of narcotic analgesic as an adjuvant for spinal anesthesia.[8] In Nepal 2-studies of similar interest were conducted showing a percent-

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age failure of 1.5% and 1.66%.[9,10] In a local study by Ikram M, et al. has showed the frequency of failed spinal anesthesia by 3.07% during cesarean section.[11]

In Pakistani population, there is a paucity of data on the frequency of failed spinal anesthesia during cesarean section. As far as our research only one study from Sargodha is found so far therefore further evidence is needed in our local population on this subject. Results of our study will be relevant for prioritizing training needs of doctors towards improving the spinal anesthesia technique during cesarean section in our local population.

Material and Methods:
This prospective cross sectional study was conducted in Department of Anaesthesia, Khyber Teaching Hospital, Peshawar from January 2016 to December 2017. 241-patients were studied as calculated by "Sample size determination formula of WHO" with 95% confidence interval, 3% margin of error and keeping prevalence of 6% frequency of failed spinal anesthesia.[7]

Non-probability consecutive sampling technique was used. Female patients with age 18 to 45-years presenting with both emergency and elective cesarean section having ASA class-1-or-2 were included and patients with documented bleeding disorders i.e. low platelet count, deranged coagulation profile, ASA class III and IV, not willing for spinal anesthesia, known valvular heart disease like Mitral stenosis, localized infection at L3/L4 and L4/L5 vertebral space, documented placenta previa with ultrasound, shock due to any condition. Patients with multiple cesarean sections resulting in multiple adhesions and surgeon not comfortable with spinal anesthesia were excluded.

After fulfilling the inclusion criteria from inpatients, department of Anaesthesia, Khyber Teaching Hospital, Peshawar was included in the study after permission from ethical committee. Informed consent was taken from all patients.

Basic demographics like name, age, type of cesarean section (emergency/elective) was recorded. Spinal anesthesia was administered by 1-or-2-anesthetists selected for the study and were use same company spinal needle and hyperbaric bupivacaine to reduce bias.

The women had intra-venous cannulation with an 18-guage cannulae and fluid preloading with between 750 to 1,000 mls of normal saline or Ringer's lactate. Monitoring included automated non-invasive blood pressure measurement, the heart rate and the arterial oxygen saturation. After recording of baseline parameters, monitoring continued with non-invasive blood pressure cycled at 3-minutes interval initially then at 5-minutes interval after the block had fixed.

The blocks were performed in the position and at the interspace chosen by the attending anaesthetist via the midline approach. With the anaesthetist scrubbed, gowned and gloved, cleaning with antiseptic solution, povidone iodine and methylated spirit and draping was done. A 24, 25 or 26 gauge Quincke type short bevelled spinal needles were used. After a free-flow of clear cerebrospinal fluid (CSF) was confirmed, the volume of 0.5% hyperbaric bupivacaine decided by the attending anaesthetist, the dose ranging from 1.8 ml to 2 ml was injected slowly into the intra-thecal space.

The women were placed in the supine position with a wedge at the right buttock. The sensory block height was determined by loss of cold sensation using methylated spirit swab. The skin incision was made when loss of sensation to cold block of T5 to T7 was reached and the patient experienced no pain at the pinch of a pair of forceps at the surgical site

The lumbar punctures were performed using a midline approach at L⅔, L¾ or L4/5. Bupivacaine in a concentration of 0.5% was used with the dose ranging from 1.8 ml to 2 ml being injected into the subarachnoid space. Those women experience pain after 10-min of administering spinal anaesthesia was classified as failed spinal anaesthesia, and intravenous ketamine

Table 1: *Stratification of failed spinal anaesthesia w.r.t age distribution (n=241)*

Failed spinal anaesthesia	18-30 years	31-45 years	Total	P- Value
Yes	10	4	14	0.8894
No	166	61	227	
Total	176	65	241	

Table 2: *Stratification of failed spinal anaesthesia w.r.t asa classification (n=241)*

Failed spinal anaesthesia	ASA Class I	ASA Class II	Total	P- Value
Yes	4	10	14	0.7799
No	73	154	227	
Total	77	164	241	

Table 3: *Stratification of failed spinal anaesthesia w.r.t type of cesarean section (n=241)*

Failed spinal anaesthesia	Emergency	Elective	Total	P- Value
Yes	5	9	14	0.3347
No	55	172	227	
Total	60	181	241	

Table 4: *Stratification of failed spinal anaesthesia w.r.t weight distribution (n=241)*

Failed spinal anaesthesia	60-70 Kg	71-90 Kg	Total	P- Value
Yes	8	6	14	0.9409
No	132	95	227	
Total	140	101	241	

was used solely as the anaesthetic agent. Data was recorded for failed spinal anaesthesia and was recorded by researcher himself on especially designed proforma.

Data was analyzed with statistical analysis program (SPSS-version-20). Frequency and percentage was computed for qualitative variables like ASA score, type of cesarean section and failed spinal anaesthesia. Mean±SD was presented for quantitative variables like age and weight. Stratifying the failed spinal anaesthesia with age, ASA score, type of cesarean section and weight was done. Post-stratification chi square test was applied, $p \leq 0.05$ was considered statistically significant.

Results:

A total of 241-patients were analyzed in which 176(73%) patients were in age range 18-30 years, 65(27%) patients were in age range 31-45 years. Mean age was 30-years with SD±10.23. 77(32%) patients had ASA grade-I while 164(68%) patients had ASA grade-II.

60(25%) patients had emergency caesarean section while 181(75%) patients had elective caesarean section. 140(58%) patients had weight range 60-70 Kg, 101(42%) patients had weight range 71-90 Kg. Mean weight was 68-Kg with SD±12.416. 14(6%) patients had failed spinal anesthesia while 227(94%) patients didn't had failed spinal anesthesia.

Stratification of failed spinal anesthesia with respect to age, ASA score, type of cesarean section and weight is given in table no 1,2,3,4.

Discussion:

Our study shows that among 241 women the mean age was 30-years with SD±10.23. 32%-patients had ASA grade-I and 68% patients had ASA grade-II. 25%-patients had emergency caesarean section while 75%-patients had elective caesarean section. More over 14(6%) patients had failed spinal anesthesia while 227(94%) patients had successful spinal anesthesia. The incidence of failed spinal anaesthesia for caesarean section necessitating conversion to general anaesthesia in this study was 6%.

Similar results were observed in another study conducted by Adenekan AT et al, in which the failed spinal anaesthesia rate in this study was 6.0%.[12] The experience of the anaesthetist was a significant contributing factor for partial or complete failure necessitating conversion to general anaesthesia (p=0.02). Intra-operative supplemental analgesic was required in 6.4% of those who had their surgery completed under spinal anaesthesia. Post-partum sterilization, exteriorization of the uterus during surgery, and surgical complications were significant risk factors for partial failure necessitating supplemental intra-operative analgesic agents. Similar results were observed in other studies conducted by Pokharel A and Rajbhandari PK et al, in which interest were conducted showing a percentage failure of 1.5% and 1.66%.[13,14] Similar results were observed in another study conducted by Ikram M et al, has showed the frequency of failed spinal anesthesia by 3.07% during cesar-

ean section.[15]

Similar results were observed in another study Shrestha et al, in which the frequency of failed spinal anaesthesia after cesarean section was 4.3%.[16] In 2008 a prospective audit of regional anesthesia failure by S. M. Kinsella in 5,080 cesarean section showing a rate of conversion of regional anesthesia to general anesthesia to be 0.8% for elective and 4.9% for emergency caesarean section.[17]

In Singapore spinal anesthesia using low dose of hyperbaric bupivacaine with narcotic analgesia was used for elective cesarean section showing a failure rate of 0.5% necessitating the use of narcotic analgesic as an adjuvant for spinal anesthesia.[18]

Conclusion:
Our study concludes that the frequency of failed spinal anesthesia was 6% during cesarean section.

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Role and contribution of authors:
Dr. Neelam Noreen Halimi, main idea, collection of data and literature review.

Dr. Muhammad Basit, helped in acquisition of data and in result analysis.

Dr. Hafiz Muhammad Waqas, helped in introduction and discussion writing.

Dr. Muhammad Javed Khan, helped in data computing, discussion writing and references.

Dr. Muhammad Ilyas, supervision, critical review & making final changes for approval of the version to be published.

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