Complication of Spinal Anesthesia in Caesarean Section

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Abstract

Objective

To evaluate the frequency of maternal complications during spinal anesthesia and within 48 hour post C/S .

Patients and Methods :-

The Study was conducted in the department of gynecology in AL-Zahra'a Teaching Hospital . The Study comprised of 300 patients who underwent caesarean section under spinal anesthesia alone or with use of assisted drugs for sedation during induction of spinal anesthesia .

Patients were followed within 48hre post – operative to see any complication which were documented .

Result

48.33% (n = 145) were between 17 – 25 years , 27% (n = 81) were between 26 – 30 y . Regarding mode of admission 61.33% (n = 184) booked while 38.67% (n = 116) were unbooked . parity distribution revealed 65% (n = 195) multigravida and 35% (n = 105) primigravida .

35% (n = 105) suffered from hypotension (Intra – operatively) 15.33% (n = 46) from hypotension (post operatively) .

Other complication occur shortly after operation include , headache 11% (n = 33) , shiveriy 7% (n = 21) , Backache 4% (n = 12) , Bradycardia 2.33% (n = 7) and urinary retention 2% (n = 6) .

However , 38 , 67% (n = 116) had no complication of spinal anaesthesia .

Conclusion

Spinal anaesthesiaconveyssignificant advantages due to the simplicity of its use and rapid onset of action.

Introduction

All over the world, regional anesthesia is commonly used for cesarean section. The choice of anesthesia is determined by the clinical condition of patient, available facilities and expertise of Anesthetist. The role of anesthesiologist is to ensure the comfort and safety[1]. Spinal anaesthesia allows the mother to be awake. It facilitates effective postoperative pain relief[2,3]. It offers many benefits to the mother and the baby over general anaesthesia. Majority of women welcome the chance to be aware during the birth of their baby. If regional anaesthesia is performed with great care and attention to maternal physiology, then it is probably fundamentally safer than general anaesthesia for caesarean section[4]. The hazards of difficult airway associated with weight gain and edema can be avoided, along with the problems of regurgitation because of physiological weakening of gastro-esophageal sphincter and an increase in gastric in volume and acid production[5]. A successful regional anaesthesia effectively suppresses many of the pain mediated stress responses to surgery such as rise in blood pressure, heart rate and increase in plasma concentrations of catecholamines, cortisol and glucose. The net advantage is that placental perfusion is maintained. It is cost effective, as lesser number of drugs are

required, making it relatively inexpensive. Spinal block is also associated with lesser amount of surgical haemorrhage[6].

The major adverse effect of spinal anesthesia for mother is hypotension[7,8]. Maternal hypotension leads to uteroplacentalhypoperfusion and can provokes an acute fall in intervillous blood flow with the potential for fetal academia[9,10]. Furthermore, cardiac arrest may occur. To improve our management and patient care, this study was conducted to determine the frequency of spinal anaesthesia related complications in patients undergoing caesarean section .

Materials and Methods

The study was conducted in the Department of Gynecology in AL-Zahra'a Teaching Hospital from April 2011 till December 2011 This was a descriptive study 300 cases and Taking expected percentage the patient with age 17 – 45 years , who underwent cesarean section in spinal anesthesia alone , were included .. this study for spinal Anesthesia 25 gauge spinal needle was introduced into the subarachwoid space at the level of L3 – 4 2 Ml of hyperaric bupivacaine solution was injected in to the space for presence or absence of hypotension regular pulse and B.P monitoring was alone every 2 minute till delivery of baby and then at five minute interval up to thirty minutes .

Advantages

- The mother remains awake and is very much part of the delivery of her baby .
- Early maternal – baby contact ,e.g . 'skin to ' contact, encourages bonding and improves success at breastfeeding .
- The baby's father or a birthing partner is permitted into the operating theatre during surgery , providing emotional support for the mother .
- Many birthing partners welcome being part of the delivery .
- Enhanced postoperative analgesia through the use of intrathecal or epidural opioids .
- Reduces incidence of postoperative sedation , which may delay bonding with the newborn baby .
- Reduced incidence of nausea and vomiting .[30]
- Early mobilization .
- Reduced incidence of postoperative deep vein thrombosis (DVT).[37]
- The direct sedative effects of GA drugs on the neonate are avoided ,i.e . delayed onset of respiration ,thermorgulation and feeding .
- Reduced incidence of regurgitation and pulmonary aspiration .[50]
- Reduced incidence of difficult or failed intubation or failed ventilation .
- Reduced operative bleeding .
- Reduced incidence of awareness .

Disadvantages

- Hypotension is associated with all regional techniques and confer significant harm to mother and neonate if not promptly treated .
- Intraoperative nausea and vomiting .[35]
- High blocks or total spinal blocks .[24]
- Failed block requiring conversion to GA .[37]
- Intraoperative pain leading to dissatisfaction and complaint .
- PDPH (Post – Dural Puncture headache) – approximate incidence 1% .[21]

- Neurological complications reported rarely .[32]
- Infection – related complications again reported rarely .[34]
- The time required to perform a regional technique or top – up an existing epidural may prohibit its use in certain situations ,e.g . delivery required in < 15 min .

Complications of Spinal Anaesthesia

(A) Complications with central neuraxial blockades

Central blockades provide excellent labour analgesia and safe anaesthesia for CS and are associated with a low incidence of severe complications. The following complications can occur with central neuraxial blockades (CNB).

(1) Post-dural puncture headache (PDPH): PDPH is a common complication of neuraxial blockade. [21] Parturient constitutes the highest risk category, the reported incidence in these patients varying between 0 and 30%. [22] PDPH is related to the size as well as the type of the spinal needle used, and it is progressively reduced with the use of thinner Quincke-type spinal needles. [23] Pencil point needles have a lower incidence of PDPH than cutting needle tip designs. [24] PDPH is a complication that should not be treated lightly. There is the potential for considerable morbidity due to PDPH. [25] It is reported that untreated PDPH leads to subdural haematoma[26] and even death from bilateral subdural haematomas. [27] Therefore, anaesthesiologists are advised to prevent PDPH by optimizing the controllable factors like spinal needle size as well as shape while conducting spinal anaesthesia. [28] PDPH is usually self-limiting and spontaneous resolution may occur in few days. Therefore, the authors recommend approximately 24 h of conservative therapy. Various pharmacological (e.g., Methylxanthines, ACTH, Caffeine) and interventional measures (e.g., epidural saline/dextran) are available to treat PDPH; epidural blood patch (EBP) has a 96-98% success rate and has been recognized as the definitive treatment for PDPH. [29],[30] Prophylactic EBP is also gaining acceptance. [31]

(2) Neurological complications [32] : Serious neurological complications related to regional anaesthesia are, fortunately, very rare. The incidence of permanent or transient neurologic complications after CNB is estimated to be between 1/1,000 and 1/1,000,000. Direct trauma to the nervous tissue may occur at the level of the spinal cord, nerve root or peripheral nerve. The epidural needle or spinal needles may touch the nerve roots or may directly injure the spinal cord. Scott and others, monitored 505,000 epidural blocks in parturients, finding only 38 single-root neuropathies (0.75/10,000). Cauda equina syndrome is another annoying complication of CNB. Rigler and others, postulated that the combination of trauma, maldistribution and a relatively high dose of local anaesthetic resulted in this neurotoxic injury. [33]

(3) Epidural abscess is a rare but dreaded complication of CNB. Epidural abscess is usually due to infection in the body seeding the epidural space. In one review, epidural anaesthesia was associated with only one in 39 epidural abscesses. [34] Neurologic deficits will progress as the spinal cord is compressed. Other symptoms include lower extremity pain, weakness, bowel and bladder

dysfunction and paraplegia. Urgent surgical treatment is necessary.

(4) Epidural haematoma: The literature has shown that epidural haematoma is another feared, but rarely seen, complication of regional anaesthesia (1/150,000-250,000) in healthy patients. [35],[36] Most epidural haematomas following regional anaesthesia occurred in patients with haemostatic abnormalities, particularly those on anticoagulants. Low-molecular weight heparins have been responsible for over 35 epidural haematomas following regional anaesthesia, and should be considered a strong relative contraindication. The current evidence suggests that a platelet count of more than 80 X 109/L is adequate for the administration of neuraxialanaesthesia provided that there are no additional risk factors. A recent survey [37] confirmed that 64-78% of the units were willing to administer neuraxialanaesthesia if the platelet count was 80 X 109/L or above.

(5) Cardiovascular complications Hypotension: Hypotension following neuraxial blockade is due to sympathetic inhibition, which causes a significant decrease in the venous return due to dilatation of the resistance and capacitance vessels. [38]Hanss and others, have identified an interesting use of heart rate variability technology to potentially prevent this problem. [39] Pre-load with crystalloids [40] to prevent hypotension is controversial as it induces atrial natriuretic peptide secretion, resulting in peripheral vasodilatation and hypotension. [41] A more rational approach is coloading, i.e. giving fluid during the procedure. [42] Ephedrine has been recommended as the vasopressor of choice for the hypotensive obstetric patient. [42] However, evidence-based analysis has shown that ephedrine and α-adrenergic agonists (phenylephrine) appear to be equally efficacious. [43]

■ Bradycardia: Decreased pre-load after spinal anaesthesia initiates reflexes that cause severe bradycardia.Atropine is typically used as the first line of therapy and also for prophylaxis. [44]

■ Supine hypotensive syndrome of pregnancy: Sometimes, severe syncope may occur along with hypotension and bradycardia due to reflex cardiovascular depression. The cause was identified as compression of the inferior vena cava by the gravid uterus, reducing the venous return and right atrial pressure. [45],[46]

■ Cardiac arrest: [47] Cardiac arrests occur significantly more often following spinal anaesthesia compared with after epidural anaesthesia. An overall incidence of seven cases of cardiac arrest for every 10,000 spinal anaesthetics versus one case for every 10,000 epidural anaesthetics has been reported. Three possible mechanisms, e.g. respiratory, cerebral and circulatory, have been speculated for cardiac arrest during neuraxialanaesthesia. Greater sedation has been observed with high spinal blocks. The possible mechanisms are the rostral spread of local anaesthetic agents or a reduction in the function of the reticular activating system caused by an interruption of the afferent inputs. There is some evidence in the early literature that cerebral hypoxia might occur during spinal anaesthesia in some patients. A circulatory etiology for cardiac arrest during spinal anaesthesia is directly or indirectly related to the blockade of sympathetic afferents and decrease of

catecholamine release by the adrenal medulla. [38],[39]

(6) Extensive block: [29] This is unusual with an intentional subarachnoid block unless there has been an inappropriately high dose of local anaesthetic or previous failed attempts at epidural placement. However, it may occur with normal dosage also due to rostral spread of anaesthetic drug. Initially, it was thought that increased pressure in the epidural space can compress the subarachnoid space, thereby disseminating the local anaesthetic. Recent research has shown that it is due to a hormonal (progesterone) effect. Subdural or subarachnoid blocks can happen unintentionally during epidural placement, causing an accidentally high block.

(7) Shivering: The incidence is 20-70% in women receiving neuraxial blockade for labour or CS. This incidence is more in spinal anaesthesia than in epidural anaesthesia. [29]

(8) Backache: Back pain in women during pregnancy is up to 76%. Previous studies reported that epidural anaesthesia for labour and delivery was associated with long-term backache. However, randomizes controlled trials and prospective cohort studies have convincingly proved that new, long-term, post-partum back pain is not caused by intrapartum epidural analgesia. [48]

(9) Catheter breakage: Epidural catheters may rarely break or shear. If part of a catheter is left in a patient, the patient should be informed. However, no surgery or attempts to retrieve the catheter are warranted unless there are persistent neurologic symptoms. [49]

(10) Local anaesthetic convulsion: [50] Convulsion occurs when the critical brain tissue concentration of local anaesthetic is exceeded. Invariably, this happens with accidental intravascular injection. The previously reported incidence was 0-0.5%, whereas it is now one in 5,000-9,000. Prompt recognition and management is essential for better prognosis.

(11) Miscellaneous: [51] The incidence of paresthesia is 8.5-42% and incidence of intravascular cannulation or blood vessel trauma is 4-12%. The incidence of inadequate analgesia in uniport catheters ranges from 31 to 32.7% and for the multiport catheters from 11 to 21.2%.

(B) Complications with non-central blockade regional anaesthetic techniques

These techniques are to be employed when the facilities for central blockade are not available or CNB is contraindicated. Anaesthetic complications are direct injury to the mother/foetus or toxicity of the local anaesthetic agent. [52]

Results

A total of 300 women were studied to determine the frequency of complication of spinal Anasthesia in cesarean section . While studying the distribution of cases by age it was found that 48.33% (n = - 145) were between 17 – 25 years , 27% (n = 81) were between 26 – 30 years , 15.33% , n = 46 between 31 – 35 years 7% (n = 21) were between 36 – 40 and only 2.34% , n = 7 were found between 41 – 45 .

Table 1 : Age distribution (n = 300)

Age (in years)	*n =*	*%*
17 – 25	145	48.33
26 – 30	81	27
31 – 35	46	15.33
36 – 40	21	7
41 – 45	7	2.34

Regarding Mode of admission 61.33% (n = 184) were found booked while 38.67% (n = 116) were unbooked cases. booked patients had at least one visit per a month to private clinic or to primary health care center.

Table 2: Distribution of Cases by mode of admission (n = 300)

Mode of admission	*n =*	*%*
Booked	184	61.33
Un – booked	116	38.67

Parity distribution revealed that 65% (n = 195) women were Multigravida while 35% (n = 105) were found primiqravida (table 3)

Table 3 : Distribution of cases by parity (n = 300)

Parity	*n =*	*%*	*Elective C/S*	*Emergency C/S*
Multigravida	195	65%	141	54
Primigravida	105	35%	37	68

Regarding type of C/S 57.67% (n = 173) were found with elective C/S while 42.33% (n = 127) were found with emergency C/S

Table 4 : Distribution of Cases by type of C/S

Type of C/S	*n =*	*%*
Elective	173	57.67
Emergency	127	42.33

Regarding use of Assisted drugs during caesarean section 65% n = 195 were used while 35% (n = 105) were unused .

Table 5 : Distribution of Cases according to use of assisted drug during C/S

Assisted drug during C/S	*n =*	*%*
Use + ve	105	35
Unuse -ve	195	65

Regarding Blood pressure level pre – operative – intra – post operative

Table 6 : Distribution of Cases- level of Blood pressure

B. pressure Measurement Pre – operative	*n =*	*%*	*B. pressure Measurement Intra - operative*		*B. pressure Measurement Post – operative after 2 hrs in the ward*	
≥ 140 systolic 90 diastolic	63	**21**	48 patient < 100 systolic < 60 diastolic	15 patient 100 - 139 systolic 60 – 89 diastolic	**17 patient< 100 systolic 60 diastolic**	
					46	**15 100 – 139 systolic 60 – 89 diastolic**
						31 ℜ 140 systolic 90 diastolic
< 100 systolic 60 diastolic	27	**9**	27 patient < 100 Systolic 60 diastolic		**16 patient < 100 systolic 60 diastolic** **11 patient 100 – 139 systolic 60 – 89 diastolic**	
100 – 139 systolic 60 – 89 diastolic	**210**	**70**	30 patient < 100 systolic < 60 diastolic	180 patient 100 - 139 systolic 60 – 89 diastolic	**13 patient< 100 systolic 60 diastolic** **197 patient 100 – 139 systolic 60 – 89 diastolic**	

Regarding level of Hemoglobin Mg/dl 61% (n = 183) were found < 11 while 39% (n = 117) were found ≥ 11 Mg/dl .

Table 7 : Distribution of Cases by Hb%

Hb level mg/dl	*n =*	*%*	*Elective C/S*	*Emergency C/S*
≥ 11	117	39	67	50
< 11	183	61	78	105

Regarding level of Blood Sugar (Random) 3% n = 9 were found ≥ 180 Mg/dl while 97% (n = 291) were found < 180 Mg/dl .

Table 8 : Distribution of Cases by RBS level

RBS level Mg/dl	*n =*	*%*
≥ 180	9	3
< 180	291	97

Table 9 Complication of Spinal Anaesthesia n = 300 within 48 hrs. post op.

Complication of Spinal Anaesthesia	*n =*	*%*	*hypotension*	*hypertension*	*anaemic*	*Diabetic*	*normotensive*
Headache	33	11%	13	10	9	1	
Shivering	21	7%	6	4	9	2	
Backache	12	4%	6	2	3	1	
Urinary retention	6	2%	2	1	3		
Bradycardia (PR < 60/ min.)	7	2.33%	3	1	2		1
No complication	116	38.67%					

Table 10 Show complication Spinal anesthesia within 48 hrpost operative

35%	(n = 105)	were found with hypotension
11%	(n = 33)	Were found with headache
7%	(n = 21)	Were found with shivering .
4%	(n = 12)	Were found with Backache
2.33%	(n = 7)	were found with Bradycardia
2%	(n = 6)	Were found Urinary retention

Discussion

Spinal anaesthesia is induced by injecting small amounts of local anaesthetic into the cerebro-spinal fluid (CSF). Spinal anaesthesia is easy to perform and has the potential to provide excellent operating conditions for caesarean section[11]. If the anaesthetist has an adequate knowledge of the relevant anatomy, physiology and pharmacology; safe and satisfactory anaesthesia can easily be obtained, to the mutual satisfaction of the patient, surgeon and anaesthetist[12]**.**

Spinal anaesthesia has distinctive advantages over general anaesthesia[1]. Anaesthetic drugs and gases are costly and the latter often are difficult to transport. The costs associated with spinal anaesthesia are minimal. Spinal anaesthesia produces few adverse effects on the respiratory system as long as unduly high blocks are avoided[3]. As control of the airway is not compromised, there is a reduced risk of airway obstruction or the aspiration of gastric contents. This advantage may be lost if too much sedation is given. Spinal anaesthesia provides excellent muscle relaxation for lower abdominal and lower limb surgery[11]. Blood loss during operation is less than when the same operation is done under general anaesthesia. This is because of a fall in blood pressure and heart rate and improved venous drainage with a resultant decrease in oozing. . The bowel is contracted during spinal anaesthesia and sphincters are relaxed although peristalsis continues. Normal gut function rapidly returns following surgery[12]. Post-operative deep vein thromboses and pulmonary emboli are less common following spinal anaesthesia[13].

Apart from multiple benefits, few disadvantages of spinal anesthesia do exist. Sometimes it can be difficult to find the dural space and occasionally, it may be impossible to obtain CSF and the technique has to be abandoned[14]. Despite an apparently faultless technique, anaesthesia is not obtained, in few rare cases[15]. Hypotension may occur with higher blocks and the anaesthetist must know how to manage this situation, with the necessary resuscitation drugs and equipment immediately available[7]. As with general anaesthesia, continuous, close monitoring of the patient is mandatory. Some patients are not psychologically suitable to be awake, even if sedated, during an operation. They should be identified during the preoperative assessment. Likewise, some surgeons find it very stressful to operate on conscious patients. Even if a long-acting local anaesthetic is used, a spinal anaesthesia is not suitable for surgery lasting longer than approximately 2 hours[14]. Patients find lying on an operating table for long periods uncomfortable. If an operation unexpectedly lasts longer than this, it may be necessary to convert to a general anaesthetic or supplement the anaesthesia with intravenous ketamine or with a propofolinfusion[16]. There is a theoretical risk of introducing

infection into the sub-arachnoid space and causing meningitis. This should never happen if equipment is sterilized properly and an aseptic technique is used. A postural headache may occur postoperatively[17]. This should be rare.

In the current study, we analyzed the immediate maternal complications during cesarean section due to spinal anesthesia. The commonest complication was hypotension which was observed in 105 patients (35%). Bradycardia in 7 patient 2.33% . A study conducted by Somboonviboon W et al[18] at Department of Anesthesiology, University Bangkok, Thailand, includes 722 parturient undergoing cesarean section under spinal anesthesia, the incidence of hypotension and bradycardia were 52.6% and 2.5% respectively. The above study also shows the high incidence of hypotension, which is comparable to our study.

In our study 33 patients (11%) complained of spinal headache in the post-operative period. The results of the study conducted by L'ubuský M et al[20] regarding post-dural puncture headache during spinal anesthesia for cesarean section reveal 9 patients (16.67%) out of 54. another study found 11% of patients with postdural puncture headache and among them 90% headache occur within 3 days of the procedure and 66% started within first 48 hours.

Neither in our study Nor in the a bove Mention studied experienced spinal shock, cardiac arrest and sub dural hematoma in any case. No procedure related infection, immediate - within six hours of the spinal anaesthesia.

Conclusion

Spinal anaesthesia conveys significant advantages due to the simplicity of its use and rapid onset of action.

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