Chapter

Second Stage Cesarean Section

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Abstract

The incidence of second stage cesarean section is on the rise. Second stage cesarean section is associated more chances of maternal and fetal injury. Though various techniques are mentioned to deliver the fetal head in second stage cesarean section, the "pull" method is associated with lesser complications. It is important to train Obstetricians in second stage section as it needs extra skill to deliver a deeply engaged head. Judicious use of oxytocin and assisted vaginal deliveries may decrease the need for second stage cesarean section.

Keywords: Cesarean section, second stage, assisted delivery, vacuum, forceps, pull method

1. Introduction

Incidence of second stage cesarean section is increasing. Its technically difficult to deliver a head which is deeply impacted inside the pelvis. Its associated with maternal trauma and sometimes even fetal trauma. The purpose of this chapter is to analyze various methods that are used to deliver the head in second stage section. The chapter also deals with complications of second stage cesarean section and its management.

2. Complications associated with second stage cesarean section

Incidence of cesarean section is increasing throughout the world, so is the second stage cesarean section. There is a steady increase in the incidence of Cesarean Section. A 10-year study showed a rising incidence of Cesarean section at full dilatation, and currently, the incidence of second stage Cesarean section is around 2% [1]. Unexpected complications, like unsatisfactory progress or fetal distress, may occur in the second stage of labour. Second stage section is usually done for CPD or fetal distress. With fewer Obstetricians not using assisted vaginal deliveries, the incidence of the second stage is increasing. Management of delay in the second stage requires a lot of skill and judgment. To deliver a head which is deeply impacted in the pelvis is difficult. Opting for a vaginal delivery with assistance requires considerable skill and judgment. In general, fewer people attempt assisted vaginal deliveries now. More and more cases are taken for a section rather than difficult assisted deliveries. Within the national maternity hospital in Dublin in a center with more than 9000 deliveries per year, While the cesarean section incidence has increased from 18.3% to 23.5% from 2005 to 2014, there is a sharp decline in assisted vaginal deliveries from 14–11% [2]. In the year 2014, there were 8000-second stage cesarean section in the UK [3].

Second stage Cesarean sections are associated with more complications than first stage cesarean sections. Cesarean section done at full dilatation of cervix with head deeply engaged in the pelvis is a potential risk factor for maternal and fetal injury. Second stage cesarean section is associated with more genital trauma and perinatal morbidity. Second stage cesarean sections can be related to trauma, bleeding, peripartum Hysterectomy. Analysis of second stage complications ere studied by V M Allen et al. in a study in 2005. They looked at the difficulties associated with second stage sections over five years. A total of 549 cases of second stage sections. Incidence of intraoperative trauma was 6.4%, and two patients underwent peripartum Hysterectomy. 57(4.7%) of cases had early postpartum bleeding. 9(1.1%) subjects had postoperative febrile morbidity. The relative risk of maternal trauma is 2.6, and perinatal Asphyxia was 1.5 in the above study by V M Allen at al [4]. In a study by Murphy et al. Second stage sections were associated with more chances of bleeding. Out of 209 women who underwent section in the second stage, 20(10%) had bleeding more than 1000 mL. Almost 50 (24%) of cases had extension of the cesarean wound after the second stage section [5].

Newborn injuries are more common following assisted vaginal deliveries than sections. Incidence of newborn trauma was (22% of 184 deliveries in Cesarean section versus 9% of 209 assisted vaginal deliveries). Severe fetal injuries, like Brachial plexus trauma, was also more common following operative vaginal deliveries [4]. Operative trauma like intracranial hemorrhage is also more common following operative vaginal deliveries. The incidence of intracranial bleeding was 1 of 860 infants delivered by vacuum extraction, 1 of 664 delivered using forceps and 1 of 907 delivered by cesarean section during labour [6]. Hence avoiding a difficult assisted vaginal delivery will decrease the incidence of severe fetal trauma. However, neonatal complications like Asphyxia and intensive care admissions are more common in second stage sections. Reduced Apgar scores and lower umbilical artery pH was 11 per cent in women who underwent cesarean section at full dilatation versus 6% among women who underwent vaginal assisted delivery [4]. However, this may be due to prolonged labour and may not be directly related to delivery mode. There was no significant neurodevelopmental delay between babies delivered by assisted vaginal delivery and Cesarean section when followed up for five years. The overall incidence of neurodevelopmental delay was low [7].

Since the Cesarean section at full dilation is associated with increased maternal and neonatal morbidity every attempt should be made to reduce the second stage cesarean section. Judicious use of Oxytocin and monitoring of labour by partogram may reduce the incidence of second-stage cesarean section. A senior consultant obstetrician's presence can result in more vaginal deliveries and can reduce cesarean section at full dilatation [8]. Instrumental delivery is more likely to fail in occiput posterior position than anterior positions. Hence a careful vaginal examination and use of ultrasound should determine the position of the head before attempting an instrumental delivery [9].

3. Technique of delivering a deeply engaged head

Impaction of the fetal head occurs when the station of head is below the level of ischial spines, and then onwards the delivery of the head becomes difficult. A deeply engaged head is hard to deliver and can cause difficulty [10]. A careful vaginal examination should be done before Cesarean section to ascertain the findings.

The incision that preferred for second stage cesarean section is Joel-Cohen incision. This is an incision 3 cm above the public symphysis. It is associated with lesser operating time [11]. When performing cesarean section in the second stage,

a higher incision is preferred on the Uterus. Blunt dissection of Uterus with fingers is associated with lesser blood loss than sharp dissection using scissors [12]. An incision lower in the Uterus may be associated with more chances of injury and extension of the uterine incision. Chances of bladder injury are more likely if the incision is lower. With a lower incision, sometimes inadvertent delivery through the vagina may also occur. Hence, it is always better to put an incision higher in the lower segment during the second stage sections. The fetal head is deeply impacted in the second stage of labour and delivering poses a challenge. The Uterus is a state of contraction, and Oxytocin infusion should be stopped before taking the patient for cesarean section. There is no evidence that Nitroglycerin relaxes the Uterus [13]. Moreover, the use of uterine relaxants may be associated with more chances of postpartum bleeding. There is no evidence that the use of tocolytics ease the delivery at second stage cesarean section [14]. Sometimes if constriction ring dystocia is suspected a low vertical incision may be used in the lower segment. A vertical lower segment incision has a risk of extension on to the bladder or upper uterine segment. It may be associated with higher chances of rupture in subsequent pregnancies. The only advantage of a vertical lower segment incision is that there are lesser chances of extension laterally into the broad ligament area.

Deepening the plane of aesthesia may help to disengage the fetal head. Upward pull of fetal shoulder may help to disengage the fetal head. The operating hand should be placed in a cup-shaped fashion and delivered to the fetal head. This conventional method of delivering the head as cephalic without assistance may result in the uterine wound's extension and is dangerous when the head is deeply engaged in the pelvis. Hence, it would be advisable to resort to one of the two commonly used "pull" or "push" method techniques. In the "push" method head is pushed from below. In the "pull" the baby is delivered as breech using a reverse breech extraction. A head low position may help the delivery of the deeply engaged head.

When the push method is used, the patient should be in semi lithotomy position. There is a risk of introducing infection into the uterine cavity, and all aseptic measures should be taken. Pressure should be uniform over the fetal head, and stress at any one point on the fetal head must be avoided. Flexion should be maintained while pushing the head up. Steady pressure applied by the operating surgeon abdominally on fetal shoulders may help ease fetal head delivery during the push method [15].

In the pull method baby is delivered as breech. One or both feet are caught and delivered. There is flexion of the thoracolumbar spine and head is lifted out of pelvis by a pull on the feet. This is called a "reversed breech extraction" of the baby. In the revere breech extraction by pull method, the risk of injury to surrounding structures was much less than the push method, especially in cases with cephalo pelvic disproportion [16].

Patwardhan's maneuver is a useful maneuver in the delivery of a deeply engaged head. If the back is anterior, one arm is delivered followed by other arm, and then the trunk is delivered. Finally, the legs are pulled out. If the back is posterior one arm followed by same side leg, other side leg and arm are delivered. In a study by Lal et al. in India, the Patwardhan's maneuver was associated with significantly fewer chances of injury and lesser need for blood transfusion [17].

The pull method has been shown to have better outcomes compared to the push method. In a study done in Nigeria, the pull method was associated with better results than the push method. The pull method was associated with lesser blood loss than the push method (1257 ml versus898 ml) and lesser uterine wound extension (33% versus 11%). Though the incidence of low Apgar scores was lesser in the pull method, there was no increase in neonatal morbidity or death between groups [18]. Levy et al. in a study compared both pull and push method. There were 48 cases

of difficult extraction of the head. When the pull method used, the incidence of extension of uterine incision was 15% compared to 50% when pushing method as used. Also, the incidence of postpartum fever was only 5% in the pull method and was very high (46%) when the push method was used. Hence the pull method of delivering the head appears safer than the push method [19].

The fetal head can get deeply impacted in pelvis following attempted vaginal delivery, especially with vacuum application and delivery, may be extremely difficult. The use of the pull method here is associated with less trauma than the push method [20].

Many other techniques which are not validated have been described for delivering a deeply engaged head. Use of Whitmore position where the legs are abducted and hips flexed at 135 degrees has been tried in the second stage section [21]. Use of non-dominant hand to lift the presenting part and use of low patient bed are other techniques that may facilitate a deeply engaged head. However, these techniques are not validated scientifically and need more studies.

Fetal disimpacting system is a silicon device that is placed in vagina and filled with saline, elevating the fetal head. It can elevate the head by 3 cm. Initial reports are promising and may be of help in delivering a deeply impacted head [22]. In a study done in India by Subartha L Seal et al., the incision to delivery was much shorter when a fetal pillow was used (297.2 ± 27.1 seconds when fetal pillow as not used versus 176.5 ± 14.0 seconds when fetal pillow was used). Significant uterine extension occurred more frequently 39/120 when fetal pillow was not used, and it occurred only in 6/120 cases when fetal pillow was used. Fetal pillow may be a possible alternative to other methods that can be of help deliver the fetal head [23].

C-snorkel is a soft, malleable tube with holes and can be placed between the vagina and the fetal head. Aeration through the tube can help to disengage the fetal head. There are no adequate trials with this equipment [24].

There is a need for adequate training in second stage sections. Second stage sections often happen in odd hours, and help from senior faculty may not be available. There is an urgent need of training a junior faculty in training for second stage sections.

4. Managing complications associated with second stage sections

Second stage sections may be associated with many complications. Extension of uterine incision and bleeding is one of the most typical difficulties in the second stage section. The deeply engaged head, lack of amniotic fluid and the thinned out lower segment predispose uterine wound extension during delivery. It is important to make an adequate incision on the abdominal wall. The loose fold of peritoneum should be picked up incised, and upper limit of the bladder should be identified to avoid injury to the bladder. The incision on the Uterus may be placed relatively at a higher level to prevent uterine incision extension. A careful delivery of head using a "push" or "pull" technique should be used. Extension of the lower segment uterine incision is one of the most typical injuries during a section. The chances extension of the uterine incision is directly proportional to the length of the second stage of labour. The uterine wound extension as 25% if the second stage of labour was 1–3 hours and increasing to 32% if the duration of the second stage of labour was 4–5 hours. Uterine wound extension commonly occurred into the lower segment, followed by the cervix [25]. If the incision has extended the edges of the incision should be identified and sutured. If there is excess bleeding Uterine artery ligation or internal iliac artery ligation may need to be done. Uterine artery ligation is done by passing an absorbable suture material like No 1 Polygalactin suture through the

myometrium medial to the Uterine artery. The suture is brought forward through an avascular area through the anterior and posterior wall of the broad ligament and sutured. Internal iliac artery ligation may be needed in cases where there is severe bleeding. When all measures have failed, sometimes Hysterectomy may be required in the extreme extension of Uterine incision. In rare instances of lateral extension of uterine incision, sometimes ureters may be injured and wise to help a Urologist repair these injuries.

Bladder injuries can sometimes occur during the second stage cesarean section due to extension. The torn bladder edges should be identified and sutured in 2 continuous layers by 3.0 or 4.0 delayed absorbable sutures. The bladder should be drained continuously for 2 to 3 weeks with continuous bladder drainage. If there is suspicion of injury to ureteric orifices, help should be taken from urologist to repair the defect.

Occasionally when the section is done in the second stage of labour, the baby may be delivered accidentally through an incision on the vagina. Hence it is essential to identify the lower segment and correct incision to deliver the baby through the lower uterine segment [26].

Patients who underwent Cesarean section in the second stage may be at increased risk of preterm labour in subsequent pregnancies [27].

5. Conclusion

Cesarean sections rates are increasing so is the increase in second stage cesarean sections. Judicious use of Oxytocin and monitoring may help to reduce the incidence of second-stage cesarean sections. Second stage cesareans sections are associated with complications like bleeding and other maternal tissue injuries. Currently, the pull method of delivering the head seems to be associated with fewer complications than the push method. Obstetricians must get trained for second stage cesarean section.

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Conflict of interest

The authors declare no conflict of interest.

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