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The Effect of Antenatal and Intrapartum Factors on Episiotomy Wound Dehiscence

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Abstract

Episiotomy is the most common labour ward procedure in obstetrics. Improper healing of the episiotomy wound can lead to prolonged and sometimes serious post-partum morbidity. Also, if infected, they may manifest as a surgical site infection and may lead to generalised sepsis. In this study, we aim to critically evaluate cases of episiotomy wound gapes and study antenatal, intrapartum, and infective causes for the same. This study aimed to study the prevalence and causes of episiotomy wound dehiscence and the maternal co-morbidities associated with them in a tertiary care centre. Methods: This observational, hospital-based prospective cross-sectional study conducted at the Department of Obstetrics and Gynaecology, Seth GS Medical College and KEM Hospital from 2017-2018. A total of 30 cases of episiotomy wound dehiscence were studied. The rate of episiotomy wound dehiscence was 2.14% for the year 2017-2018. More than half (60%) of the patients have a wound dehiscence were overweight or obese. Anaemia, obesity, diabetes mellitus, and hypothyroidism were the main antenatal high-risk factors identified. In the intrapartum factors, wound dehiscence was more common in patients in whom labour was induced and those undergoing instrumental delivery. 70% of the cases were diagnosed between post-partum day 7-14, and the main presenting complaint was pain at the episiotomy site. The main organisms noted in infected wounds were *Escherichia Coli* and *Klebsiella Pneumoniae*. In conclusion, episiotomy wound dehiscence is an important cause of post-partum morbidity and prolonged hospital stay. This study revisits the need to correct antenatal factors like obesity, anaemia, and hypothyroidism and highlights the need to refine intrapartum practices and post-natal follow up in patients at high risk for this condition.

Keywords: Episiotomy, *Escherichia Coli*, Instrumental Deliveries, Obesity, Anaemia, Peripartum Infection, Surgical Site Infections, Wound Dehiscence

1. Introduction

Episiotomy comes from the Greek work *epision*-pubic region-plus-*tomy*-to cut. 85% of the patients who have a vaginal delivery will have some sort of perineal trauma, 60-70% of whom will need suturing (Fitzpatrick M, O'Herlihy C, 2007).

Episiotomy is a surgical incision taken on the perineum in the second stage of labour in order to facilitate delivery (Cunningham FG, Leveno KJ, Bloom SL, Spong CY, Dashe JS, Hoffman BL, et al, 2010, p.698-690) The three types of episiotomy described are medial episiotomy, lateral episiotomy, and mediolateral episiotomy. The most common type practised is the mediolateral episiotomy.

National episiotomy rates have decreased steadily since 2006, when ACOG recommended against routine use of episiotomy (Cunningham FG et al., 2010). Data shows that in 2012, 12 percent of vaginal births involved episiotomy, down from 33 percent in 2000 (ACOG Practice Bulletin, 2016).

Episiotomy being an iatrogenic perineal wound, like in any wound healing, factors affecting healing are: infections, diabetes, nutritional status, glucocorticoids, mechanical factors like pressure, poor perfusion, the type and location of injury (Kumar V, Abbas AK, Aster JC, 2015, p.106). Data from 1990 to 2004 shows that the leading cause of episiotomy dehiscence is undoubtedly infection (Cunningham FG et al., 2010). Anaemia and hypo-proteinemia are one of the common co-morbidities associate with delayed wound healing (Winkler KP n.d.). Hypothyroidism, one of the common endocrine disorders seen in pregnancy is also one of the main contributors to this problem (Natori J, Shimizu K, Nagahama M, Tanaka S, 1999).

Each of the three types of episiotomy mentioned above have their own merits and demerits. The traditional debate related to episiotomy involves (a) selective vs routine episiotomy (a)the best type in terms of wound healing, blood loss and pain and (b) the most appropriate suture material used for suturing the wound. However, nullifying these variables and taking into account the standard practice of doing a selective mediolateral episiotomy with a polyglactin suture material, i.e. inspite of standard protocols being followed, complications related to episiotomies still persist such as wound infection and wound dehiscence.

Inspite of episiotomy being one of the commonest procedures done in obstetrics worldwide, data and awareness regarding episiotomy wound dehiscence remains sparse due to the rare nature of the condition. The available research in this topic focuses on the traditional debate of type of episiotomy and the suture material used. There have been no studies exploring the fact that common maternal conditions like anaemia, obesity, hypothyroidism, diabetes, and intrapartum factors also have an effect on the wound healing.

Hence, this study intends to audit cases of episiotomy wound dehiscence over a period of one year in a tertiary care institute and study it giving emphasis to the maternal co-morbidities and intrapartum factors. We hope that by doing this study, we will be able to identify the women who are pre-disposed to having an episiotomy wound healing problem and provide them with a more rigorous follow-up schedule and better antibiotics.

This study, we hope will help us make better policies for the women at risk of wound dehiscence and reduce the incidence of perineal wound dehiscence to nil.

2. Aims and Objectives

- a) To study the causes and of episiotomy wound dehiscence and their prevalence.
- b) To study the maternal co-morbidities in cases of episiotomy wound gapes.
- c) To study the common organisms involved in episiotomy wound gapes.

3. Methods

This prospective observational study was done at Seth GS Medical College and KEM Hospital, Mumbai, for a period of one year after the clearance of the Institutional Ethics Committee. All women in the puerperal period from day 1 of post-delivery to 6 weeks post vaginal delivery in our institute with clinical evidence of episiotomy wound dehiscence were included in the study. Those women who had delivered outside the hospital, those referred post-delivery with no records and women who had sustained 3rd and 4th-degree perineal tears were excluded from the study. A total of 30 cases were included in the study. Patients were recruited in the study when clinically diagnosed with episiotomy wound gape either in post-natal ward or in the routine post-natal

check-up (usually between days 10 and 15) in the outpatient department. Consent from the cases was taken for inclusion in the study. A wound swab was sent for culture and antibiotic sensitivity at the time when the wound gape was diagnosed. Detailed examination of the patient was done to record information which included demographic details, details of the present pregnancy: antenatal and intrapartum details, medical/surgical high risks if any and details of the wound dehiscence examination along with the treatment being given. Patient was followed up for whether conservative management or re-suturing was done and for the duration of stay in hospital. Analysis of the data was done using the software SPSS 16.0. The prevalence of every criteria included was calculated as a percentage of the total. The quantitative data of the study population was analysed using means, medians, and percentages

4. Results

4.1 Demographic Details:

4.1.1 Age: The mean age of the study participants was 26.8 years (20- 35 years).

4.1.2 Parity: Of the cases studied, 46.7% were primigravids, and 53.3% were multigravida patients.

4.1.3 Body Mass Index (BMI):

Table 1. Division of cases according to BMI

Class	Frequency
Underweight (BMI<18.5)	00
Normal Range (BMI: 18.5-24.9)	12
Pre-obese (BMI: 25.0-29.9)	13
Obese (BMI: >= 30.0)	05

More than half of the cases of episiotomy wound dehiscence were either overweight or obese. 43.3% of patients were overweight, and 16.6% of patients were obese according to WHO [World Health Organisation] standards.

4.2 Details of present pregnancy and intrapartum details:

4.2.1 Gestational age at delivery:

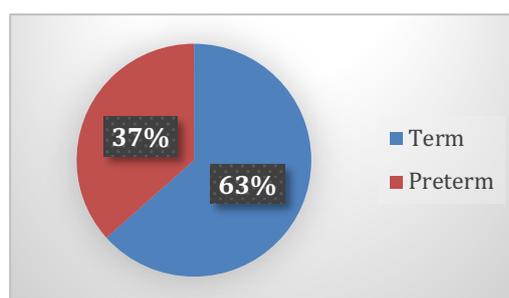


Figure 1. Gestational age at delivery

4.2.2 Maternal co-morbidities seen:

Table 2. Main maternal co-morbidities seen in the study.

Condition	Frequency
1. Overweight and Obesity	18
2. Anaemia	12
3. Hypothyroidism	09
4. Diabetes	07

5. Others (pregnancy induced hypertension, jaundice)	06
6. Nil	03

Anaemia and obesity remain the main co-morbidities seen in the cases in our study, followed by the endocrinological conditions commonly seen in pregnancy: diabetes and hypothyroidism.

4.2.3 Type of labour and mode of delivery:

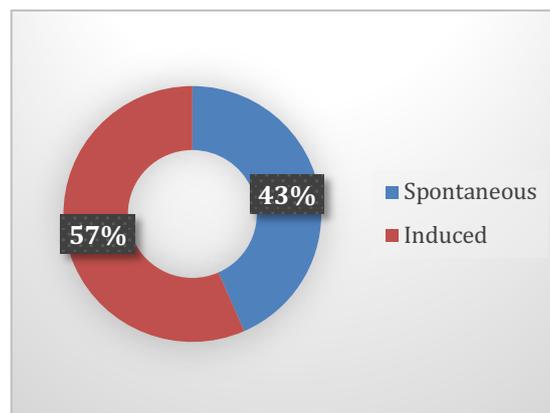


Figure 2. Type of labour

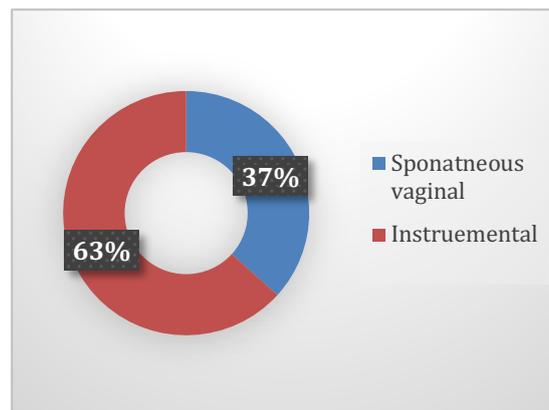


Figure 3. Mode of delivery

4.2.4 Intrapartum details:

- The average duration of the first stage of labour in patients with episiotomy wound dehiscence was 8.3 hours.
- Effect of second stage: Majority of the patients with wound dehiscence had a second stage of >1-hour duration.

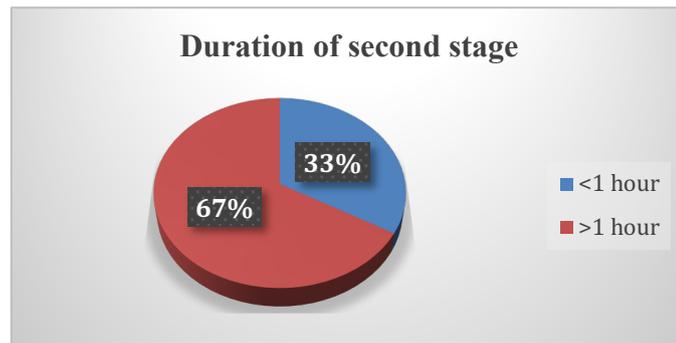


Figure 4. Division of cases according to duration of 2nd stage of labour

4.2.5 Instrumental Delivery Details:

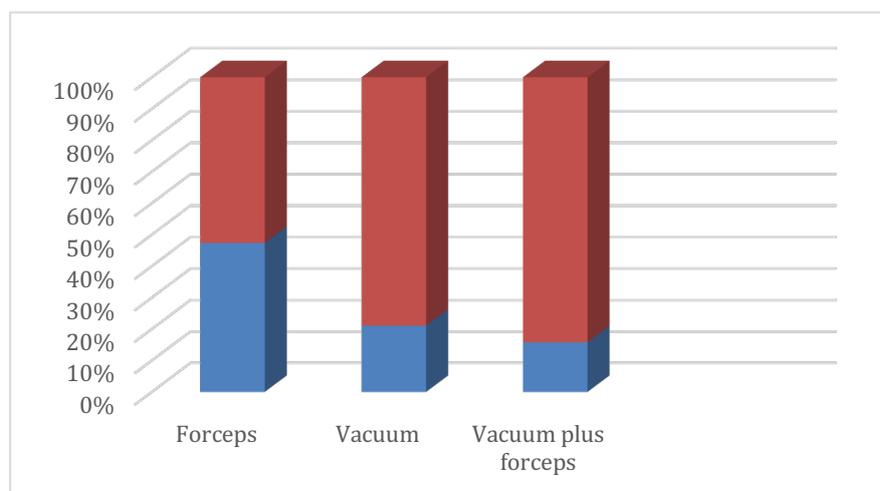


Figure 5. Details of the instrumentation done during delivery.

Out of the total 19 instrumental deliveries, the maximum were forceps application followed by vacuum.

4.3 Details of wound dehiscence:

4.3.1 Day of diagnosis:

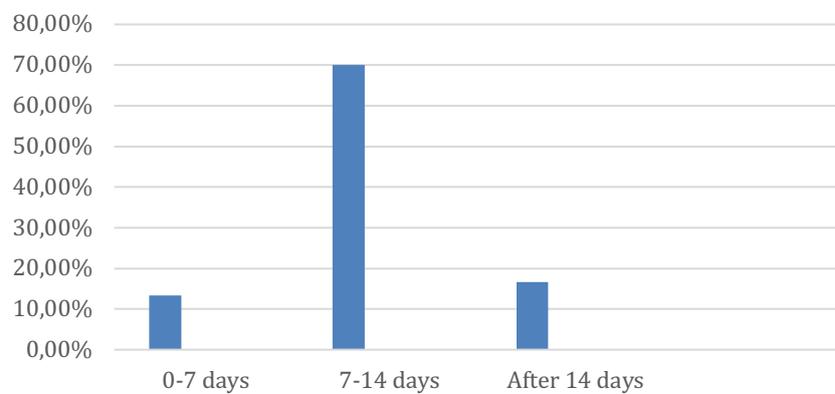


Figure 6. Distribution of cases according to the day of diagnosis

Maximum number of cases (70%) were detected between days 7 and 14 of the delivery.

4.3.2 Presenting complaints:

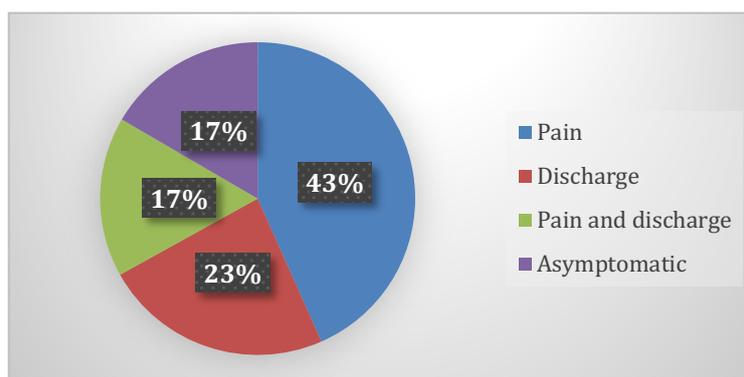


Figure 7. Chief presenting complaints

The main presenting complaint was pain at the episiotomy site followed by discharge. 17% of the patients were asymptomatic for the wound dehiscence.

4.3.3. Wound culture report:

Table 3. Main organisms seen in the wounds of patients with dehiscence

Organisms seen	Frequency
1. E. Coli	08
2. Klebsiella	04
3. Proteus	03
4. Enterococcus	02
5. Acinetobacter	01
6. Methicillin Resistant Staphylococcus Aureus (MRSA)	01
7. Pseudomonas	03
8. Multiple organisms	02
9. No growth	08

Discussion

Episiotomy is one of the most common surgical procedures done in obstetrics to facilitate vaginal childbirth. Restrictive use of episiotomy practised in Oxford from 1980-1984 paved the way for restrictive/selective over liberal/routine use of episiotomy (Reynolds JL, Yudkin PL, 1987) Many studies done worldwide later also supported the practice of restrictive vs routine episiotomy. WHO also in 2018 audited 11 randomised controlled trails and concluded that restrictive episiotomy is better than routine episiotomy (WHO recommendation, 2018).

However, even after this paradigm shift in our concept regarding the use of episiotomy, women in low- and middle-income countries remain at a higher risk of episiotomy than those in high-income ones. According to a recent study by Singh et al. in 18 tertiary care hospitals across India, studying 1,20,243 vaginal deliveries, the rate of episiotomy was found to be as high as 63.4% (Singh S, Thakur T, Chandhiok N, Dhillon BS, 2016). Hence, it is very important for us to know the risks and the morbidities arising from this procedure.

Episiotomy has been associated with various short- and long-term complications (Gün İ, Doğan B, Özdamar Ö, 2016).

Table 4. Complications of episiotomy

Short term complications	Long term complications
Perineal lacerations	Chronic infection
Haemorrhage, hematoma formation	Anorectal dysfunction
Wound infection and dehiscence	Urinary incontinence
Anal and rectal mucosal damage	Pelvic organ prolapse
Urethral and bladder injury	Sexual dysfunction
Pain	Pain

Extensive research has been done on effect of episiotomy on perineal lacerations, urethral and bladder injuries, episiotomy leading to anorectal dysfunction, dyspareunia and urinary incontinence. However, data on episiotomy wound infection and dehiscence remains sparse.

The precise incidence rate for childbirth-related perineal wound dehiscence remains unknown. However, there has been little change in the incidence of episiotomy wound dehiscence over the last 3 decades inspite of the introduction of restrictive episiotomy, more institutional deliveries, and better antibiotics. Ramin, Ramus, Little and Gilstrap (1992) reported figures of 0.1 – 0.2%, while a rate of 4.6% in relation to 4th-degree tears was suggested by Goldaber, Wendel KG, McIntire and Wendel GD(1993) whereas Dimitrov, Tsenov and Ganeva (2000) reported a rate of 1.07%. In our study, the incidence of episiotomy wound dehiscence was 2.14%. The possible contributing factors which may lead to episiotomy wound dehiscence can be antenatal, intrapartum, or post-natal.

Antenatal factors that affect wound healing include poor nutrition, obesity, medical conditions such as diabetes, immunocompromised status, anaemia, hypothyroidism, and smoking. Substantial evidence exists demonstrating that obesity is associated with a number of postoperative complications, including deficient wound healing. In our study, 60% of the women with episiotomy gapes were either pre-obese or obese. Studies have shown that compared to non-obese women, moderately obese women and severely obese women were at 1.6- and 4.45-times risk of caesarean section and episiotomy wound infections respectively (Robinson HE, O 'Connell CM, Joseph KS, McLeod NL, 2005). In the study by Kingsbury B, Rathore S, Chelliah H, Londhe V, et al. (2018) of 14,759 peripartum patients, obesity was found to be a significant risk factor for wound dehiscence. Thus, obesity remains an important factor for episiotomy wound dehiscence. Various medical conditions like anaemia, jaundice, diabetes, hypoalbuminemia, malnutrition is also known to impair wound healing (Spiliotis J, Tsiveriotis K, Datsis AD, Vaxevanidou A, et al., 2009). In our series anaemia (40%), diabetes (23.3%) and hypothyroidism (30%) are seen to be the major maternal co-morbidities seen in cases of wound dehiscence. Kingsbury et al. and Kamel A & Khalid M (2014) in their studies, also cite anaemia as a significant factor contributing to wound dehiscence. A lot of evidence has been gathering about the effect of thyroid hormone on wound healing. Experimental studies done by Natori et al. and clinical studies done by Ekmektzoglou KA, Zografos GC (2006) both show that thyroid hormone is an essential part of wound healing due to its role in the synthesis of hydroxyproline and collagen type- IV. In our study, it is the second most common medical co-morbidity seen in cases of wound dehiscence. No other studies in our knowledge are found showing the co-relation of hypothyroidism as a cause of wound dehiscence. Diabetes is known to cause delayed wound healing by causing slow response of the polymorphonuclear leucocytes and fibroblasts. Although diabetes has been found to be the third most common co-morbidity associated with wound dehiscence in our study, both Kingsbury et al. and Williams MK and Chames MC (2006) did not find a significant correlation between the two. Other maternal co-morbidities seen in our series were pregnancy-induced hypertension, jaundice, and febrile morbidity due to dengue. In 3 cases no co-morbidities were seen in the cases. A few more antenatal factors mentioned by Kamel and Khalid that are not seen and studied in our series are bacterial vaginosis, immunocompromised status, and human papilloma virus infection. Snyder RR, Hammond TL, Hankins GD(1990) in their study of episiotomy dehiscence in the immediate postpartum period, found that human papilloma virus (HPV) infection was associated in up to 30% of patients who had episiotomy breakdown.

Intrapartum factors like pre-term or post-term labour, prolonged rupture of membranes, intrapartum fever, multiple internal examination, operative vaginal delivery, manual removal of placenta and retained products of conception are risk factors for wound dehiscence. In our series, 57% of the patients with wound dehiscence had

their labour induced while only 43% had spontaneous labour as compared to Ganapathy et al., in whose series 30% of the patients were in induced labour (Ganapathy R, Bardis NS, Lamont RF, 2008). The high incidence of dehiscence in our series can be explained due to repeated vaginal examinations, the increased incidence of premature rupture of membranes and inductions done for pre-eclampsia and diabetes. Comparing the mode of delivery, in our series, 63% of the cases had an instrumental delivery showing that instrumentation is an important factor associated with wound dehiscence. Ganapathy et al. and Williams et al. also showed instrumental delivery to be significantly associated with wound dehiscence. Instrumental deliveries predispose the patient to the risk of larger and deeper episiotomies, hematoma formation, and bleeding, all of which are risk factors for dehiscence. Another factor that had a correlation to wound dehiscence was the duration of second stage of labour. Both our study (67% incidence) and study by Williams et al. showed that duration of 2nd stage more than 1 hour is significantly related to increased chances of wound dehiscence. This is probably due to increase in per vaginal examinations (4 vs 1 in the cases where 2nd stage was <1 hour) and the increased risk of instrumentation (69% vs 31%) with increasing duration of 2nd stage.

Although maternal mortality is extremely rare, an infected perineal wound is a potential route for systemic infection, whereby sepsis and septic shock may ensue (Lewis G, 2007). Infection of episiotomy wounds fits into the criteria for Superficial Incisional Surgical Site Infection (Horan TC, Gaynes RP, Martone WJ, Jarvis WR, et al. 1992). Majority of obstetrical skin and soft tissue infections episiotomy infections are polymicrobial and results mainly from contamination with both aerobes, including Gram-negative bacilli, enterococci, group B streptococci, and anaerobes (Hussein J, Walker L, 2010). In our series, 73% of the wound gapes were infected with one or more organisms. The most common organism was Escherichia Coli. Rates of infection-causing perineal wound dehiscence has been quoted to be 40.7% by Williams et al and 61% by Goldaber et al. Postpartum factors that precipitate infections include poor aseptic technique, delayed or omitted prophylactic antibiotics, suboptimal haemostasis, haematoma, practitioner skill, contamination of wound or surgical site and residual dead space following wound closure. There have also been cases reported by Rotas M, McCalla S, Liu C, Minkoff H (2007) where an infected episiotomy wound has led to methicillin-resistant staphylococcus aureus necrotizing pneumonia and maternal death due to postpartum necrotizing fasciitis (Lynch CM, Pinelli DM, Cruse CW, Spellacy WN, 1997).

Most studies done previously highlight the fact that perineal wound dehiscence is related to 3rd and 4th-degree perineal tears. However, excluding the same, we found that even simple episiotomies can get infected or have dehiscence in the presence of antenatal risk factors like anaemia, hypothyroidism, and obesity.

Majority of the perineal wound infections present within one to two weeks of hospital discharge as shown by both Yokoe DS, Christiansen CL, Johnson R, Sands KE, et al. (2001) and Kamel and Khalid. In our series also, 70% of the patients presented within 7-14 days with complaints of either pain (43%), discharge from the wound site (23%) or both (17%) in majority of the cases. Resuturing of the wound was needed in only 40% of the cases. This was mainly seen where the wounds were deep, and all the three layers of the episiotomy had given way. Patients had to stay on an average 11 days either for dressing or for the resuturing to be done.

Conclusion

Episiotomy wound dehiscence though rare and under-reported, is a cause of significant postpartum morbidity. Antenatal risk factors like anaemia and obesity, intrapartum factors including type of labour and duration of 2nd stage and need for instrumentation also have significant prognostic value in predicting episiotomy wound dehiscence. It should be remembered that episiotomy wound dehiscence remains one of the main causes of readmission and prolonged hospital stay. Hence, better follow up strategies for these high-risk patients needs to be planned along with revision of the antibiotic policy for those predisposed to having wound gapes. Enhanced vigilance and correction of antenatal risk factors remain key strategies to in the reduction of this post-partum morbidity.

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