

POST CESEREAN WOUND SEPSIS: Recognizable Risks and Causes at a Rural Ugandan Hospital

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Abstract

Post cesarean wound sepsis refers to a superficial surgical site infection that occurs within 30 days of the operative procedure and involves only the skin or subcutaneous tissue of the incision, and at least a purulent drainage from the incision or isolation of Organisms on culture or one of the cardinal signs of inflammation.

Wound sepsis increases morbidity, mortality and length of hospital stay (Oliver, et al). In Uganda, rates of severe wound infection are as high as 25% [1]. Caesarean section rates at the Bwindi community Hospital are 30% of the total deliveries.

Purpose: To determine the factors associated with post cesarean wound sepsis among mothers at Bwindi Community Hospital.

Methods: This was a retrospective cross sectional study. Consecutive sampling was used to obtain 50 files of mothers who got post cesarean wound sepsis and a matching equal sample of controls at Bwindi Community Hospital from July 2015 to June 2017.

Results: The rate of post caesarean sepsis was 3.5%. Multiple factors were associated with postoperative wound sepsis; Age between 26-30 years (OR 3.46, p0.008), Parity of greater than 5 (OR 3.14, p0.010), Duration of labor of 5 -8hrs or greater (OR 10.67, p0.013), delayed time of ambulation greater than 24-72hrs (OR 0.14, p<0.001), intra operative blood loss of 500-1000mls or greater (OR 8.00, p0.023) and Post-operative administration of ampicillin and metronidazole (OR40.00, p<0.001).

Conclusion: Post-operative wound sepsis in caesarean section is a relatively common occurrence in low-resource settings and mitigation of the multiple identified modifiable associated factors will greatly reduce patient morbidity and improve their outcomes.

Keywords: Resource-Poor Healthcare, Uganda, Wound Sepsis, Caesarean Section, Surgical Site Infection

Background

Surgery is now recognized as an important component of public health in low and middle income countries [2-4].

However surgical site infection following Caesarean section is a common cause of morbidity with reported rates of 3-15% [5]. SSI represents a substantial burden to the health system including increased length of hospitalization and costs of post discharge care [5].

SSI are the most common nosocomial infection in sub-Saharan Africa (SSA) [2,6].

Risk factors observed for post-operative SSI are multi factorial and include the type of surgical procedure, length of the operation, and

the patient's prior comorbidities [7,6].

At Bwindi community hospital, pre-surgical optimization, intra operative asepsis and quality post-operative care are adhered too, for prevention of surgical site infection after caesarean section. Despite all the above endeavors, of the 481 total caesarean sections in 2016, 17 (3.5%) mothers got post caesarean wound sepsis. However contributing factors have never been investigated, thus the purpose of this study was to find out the likely factors associated with this post caesarean surgical site infection at the institution.

Methods

General objective

The purpose of the study is to determine the factors associated with post caesarean wound sepsis amongst mothers at Bwindi community hospital.

Specific objectives

- To determine the patient related factors associated with wound sepsis among post caesarean section mothers at Bwindi community hospital.
- To determine the hospital related factors associated with wound sepsis amongst post caesarean mothers at Bwindi community hospital

Study design

This was a retrospective cross-sectional study, conducted at the sexual and reproductive unit Bwindi community hospital. Mothers came in through the following channels; referral from health centers, self-referrals and admissions through the Mothers Waiting Hostel (MWH). During admissions and throughout their stay at the hospital, assessment, examinations and labor decisions are made and shared with the mother amongst which is caesarean delivery.

Study population

All mothers who underwent caesarean section between July 2015 and July 2017

Exclusion criteria

- All files of mothers who underwent C-section and got wound sepsis

Exclusion criteria

- Mothers who underwent caesarean delivery and were referred out immediately
- Mothers who died during the course of management.

Sample size determination

Using Kish and Leslie, and adjusting for 10% for incompleteness of Data; N=100 Consecutive enrollment was done of the files fulfilling the inclusion criteria until the required size was obtained.

Study procedure

Consent was obtained from the hospital to access the patient data. The researcher picked out the files of mothers who had undergone caesarean delivery and got sepsis and an equal number of the files of mothers who had been done C/S and did not get post caesarean wound sepsis using simple random sampling.

Statistical analysis

Data was entered using EPI DATA version 3.1 and exported into STATA version 12 for analysis. The continuous and categorical variables were analyzed summarized in tables. Bi-variate analysis was done.

Results

Table 1: Patient related factors associated with post cesarean wound sepsis N=100

Variable	Sepsis n (%)	no sepsis n (%)	OR	P-value
Age				
18-25	27(61.4)	17(38.6)	1	
26-30	11(31.4)	24(68.6)	3.46	0.008
30 – 45	12(57.1)	9(42.9)	1.19	0.745
Parity				
<5	40(58.8)	28(41.2)	1	
>5	10(31.3)	22(68.7)	3.14	0.010
Duration of labor				

<5hrs	20(57.1)	15(42.9)	1	
5 -8hrs	1(11)	8(89)	10.67	0.013
8-12hrs	14(42.4)	19(58.6)	1.81	0.225
> 12hrs	15(65.2)	8(34.8)	0.71	0.538
Hemoglobin levels				
< 8g/dl	5(83.3)	1(16.7)	1	
8 -10 g/dl	2(33.3)	4(66.7)	10.00	0.078
>10 g/dl	16(48.5)	17(51.5)	5.51	0.115
not done	27(49)	28(51)	5.18	0.110
Patients co-morbidities				
HIV	11(68.8)	5(31.2)	1	
Hypertension	1(25)	3(75)	6.60	0.110
gestational diabetes	1(20)	4(60)	8.80	0.054
Anemia	5(62.5)	3(37.5)	1.32	0.759
None	32(47.8)	35(52.2)	2.40	0.131
Time of ambulation				
24hrs and less	4(16.7)	20(83.3)	1	
24-72hrs	42(59)	29(41)	0.14	<0.001
>72hrs	4(80)	1(20)	0.05	0.003

Table 2: Health facility related factors associated with post caesarean wound sepsis N=100)

Variable	Sepsis n (%)	No sepsis n (%)	OR	P-Value
Number of vaginal examinations				
None	15(46.9)	17(53.1)	1	
<4	15(41.6)	21(58.4)	1.23	0.666
4 and above	20(62.5)	12(37.5)	0.53	0.209
Indication of CS				
PROM	4(57.1)	3(42.9)	1	
previous scars	11(35.5)	20(64.5)	2.42	0.291
obstructed labor	24(58.5)	17(41.5)	0.94	0.944
fetal distress	11(52.4)	10(48.6)	1.21	0.826
Type of CS done				
Elective	11(39.3)	17(60.7)	1	
Emergency	39(54.2)	33(45.8)	0.55	0.181
Pre- operative antibiotics given				
Yes	42(48.8)	44(51.2)	1	
No	8(57.1)	6(42.8)	0.72	0.564
if yes which ones (n=86)				
Ampicillin	37(50)	37(50)	1	
Ceftriaxone	5(41.7)	7(58.3)	1.4	0.592
Duration of surgery				
> 1hr	3(75)	1(25)	1	
30 min -1 hr.	47(50.5)	46(49.5)	2.94	0.337
0 -30min	0(0)	3(100)	0	0.047
Estimated blood loss				
>1000mls	4(66.7)	2(33.3)	1	
500-1000mls	5(20)	20(80)	8.00	0.023

100-500mls	41(60)	27(40)	1.3	0.759
0 -100mls	0(0)	1(100)	0	0.213
Type of suture used				
Absorbable	37(45.7)	44(54.3)	1	
non absorbable	13(68.4)	6(31.6)	0.39	0.074
Post-operative antibiotics given				
Yes	50(50)	50(50)		
Which ones				
ampicillin and gentamycin	16(94)	1(6)	1	
ampicillin and metronidazole	2(50)	2(50)	40.00	<0.001
ceftriaxone and metronidazole	32(42)	44(58)	22.00	<0.001
Duration of catheter				
24 -72hrs	41(49.4)	42(50.6)	1	
>72hrs	9(52.9)	8(47.1)	0.87	0.790

Discussion

Surgery is now recognized as an important component of public health in low and middle income countries [2,4,6,3].

However surgical site infection following Caesarean section is a common cause of morbidity with reported rates of 3-15% [5]. SSI represents a substantial burden to the health system including increased length of hospitalization and costs of post discharge care.

SSI are the most common nosocomial infection in Sub-Saharan Africa (SSA) [6].

A surgical site infection is defined as an infection which occurs at the incision / operative site (including drains) within 30 days after surgical operation if no implant is left in place or within 1 year if an implant is left in place. The infection must appear to be related to the surgical procedure [8].

In Uganda, rates of severe wound infection are as high as 25% [1]. Caesarean section rates at the Bwindi community Hospital are 30% of the total deliveries.

At Bwindi community hospital, pre-surgical optimization, intra operative asepsis and quality post-operative care are adhered too, for prevention of surgical site infection after caesarean section. Despite all the above endeavors, of the 481 total caesarean sections in 201, 17 (3.5%) mothers got post caesarean wound sepsis. However contributing factors have never been investigated, thus the purpose of this study was to find out the likely factors associate with this post caesarean surgical site infection at the institution.

The rate of post caesarean sepsis was 3.5%. Rates of 2.8% Mah et al. (Mah MW, 2001) And Mathew et al. (Mathew M, 2002) were reported by respectively, and these are comparable to similarly low rates of 2.8% and 2–5% in the USA and certain European countries [9-11]. Higher rates were noted in other studies, at 9.3%, 9.1% and 9.6% respectively [12,13]. The rate of SSI has been reported to be from 5.7–9.0%, and many other studies in various centers reported infection rates ranging from 6.09–38.7% [14-18].

Parity of >5 had 3.14 chances of developing sepsis p value 0.010, this agrees with Hansa et al. who found that those women with more than six children were 1.4 times more likely to contract a wound infection compared to those women who were delivering for the first time or had only one child [7].

According to the study, wound infection was common among mothers who labored for 5 -8hrs or more with an odds ratio of 10.67, p value 0.013. This concurs with Jama et al. and Koigi who also found out that labor of 8 hours or less was protective against post caesarean wound infection [19,20]. Prolonged labor, after a full trial of vaginal delivery, was observed in 20 post caesarean wound sepsis mothers (9.47%), and similar findings were reported by Ezechi et al [7,12]. Prolonged labor of greater than 8 hours may be associated with Ezechi et al premature rupture of membranes and increased number of vaginal examination.

In this study, a delayed time of ambulation of >72hrs was significant with a p value of 0.003 which was statistically significantly. This agrees with Stolbrink et al. who found that early ambulation reduces post-operative sepsis [21]. This can be explained in that early ambulation improves on cardiac function, thus improved wound and tissue perfusion with less chances of getting wound sepsis.

Study findings also revealed sepsis rates were higher in mothers who had anemia as co-morbidity prior to the CS, 62.5% when compared with the controls of 37.5% Hansa et al. had similar findings where the risk of wound infections among those women who were mildly, moderately or severely anaemic was higher compared to those without anaemia [7]. Anemia prior to CS means that the hemoglobin levels are reduced and therefore there is a less carriage of oxygen to the incision site which is vital for wound healing.

Health related factors associated with post caesarean wound infection

In this study, vaginal examinations above 4 times were associated with post caesarean wound sepsis at rates of 62.5% versus controls with 37.5%.

The study found that the majority (54.2%) of the cases with sepsis were emergency caesarean section when compared with the elective caesarean section group.

It was also noted that administration of a superior broad spectrum antibiotic with anaerobic cover was protective against post-surgical sepsis with a p value of <0.001. This agrees with most studies including Francis et al, who Suggested that prophylactic antibiotic administration reduces the risk of post caesarean wound infection, especially a single dose of a cephalosporin [22]. Comparing antibiotic prophylaxis to no prophylaxis or placebo for preventing infection following caesarean section, the use of prophylactic antibiotics significantly reduced the incidence of wound infection (RR: 0.40, 95% CI: 0.35–0.46), endometritis (RR: 0.38, 95% CI: 0.34–0.42), and maternal serious infectious complications (RR: 0.31, 95% CI: 0.20–0.49) [23].

Prolonged duration of surgical procedure (longer than 60minutes) was also found out to be associated with post caesarean wound sepsis with a percentage of 75%. This leads to more wound exposure to microorganisms as well as hypothermia that decreases tissue perfusion that may predispose to post caesarean wound infection and agrees with findings of Wloch C et al. [13].

Additionally blood loss of 100-500mls and above was also found statistically significant with OR 8.00, p value 0.023. This agrees to the findings of, Koigi et al in Central Kenya [20].

The study also found out that in the group that had the catheter stay for more than 72hr, 52.9% developed sepsis. This may be explained a high likelihood of ascending infections due the pericatheter colonization of the catheter by the bacteria.

Limitations

- Follow-up of cases after discharging from the hospital was not done and this might have contributed to a low rate for post cesarean wound sepsis.
- A number of charts had valuable missing information which affected the sample size - - Vaginal examinations recorded on the partograph were the only ones considered, thus missing out the ones done in the latent phase.
- Only mothers who got sepsis while still at hospital or those who returned to hospital were captured.

Conclusion

A number of modifiable factors were identified by this study, which if improved by meticulous clinical and nursing practices would greatly reduce the morbidity associated with post cesarean sepsis amongst mothers.

Recommendations

- Early ambulation, 24 hours after caesarean section should be emphasized for all mothers.
- A study should be done on the causes of anemia in pregnancy in this setting.
- There is need to reinforce policies on prophylactic antibiotic administration including the time of administration.
- The surgical team should evaluate and mitigate some of the factors that lead to prolonged operation time and increased blood loss.
- A satisfactory surveillance system is essential in the hospital to reduce the rate of sepsis, with reliable feedback to clinicians, enforced through the infection control committee of the hospital.
- Further studies on the adequacy of the pre op evaluation needs to be done for all mothers undergoing cesarean section
- There should be clear policies on nutritional advice post-delivery for all mothers before discharge.

Post Operative Administration of Ampicillin and Gentamycin For 48hours Reduces The Risk of Wound Sepsis

Implications to nursing practice

Reducing the rate of post caesarean wound sepsis will help to reduce the unnecessary morbidity and associated socioeconomic consequences for the patient and her family.

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