

Uterine incision closure at caesarean section: A randomised comparative study of intraperitoneal closure and closure after temporary exteriorisation

*O. C. Ezechi, B. K. E. Kalu, F. O. Njokanma,
C. A. Nwokoro and G. C. E. Okeke
Havana Specialist Hospital, Lagos, Nigeria.
P. O. Box 488, Surulere, Lagos, Nigeria.
E-mail: ozechi@yahoo.co.uk

Summary

Background: The safety of the technique of uterine exteriorization at caesarean section though popular among obstetricians, remains controversial.

Objective: To evaluate the influence of exteriorization of uterus during uterine repair on caesarean morbidity.

Methods: A randomized comparative study of 136 women undergoing primary caesarean delivery at Havana Specialist Hospital Lagos Nigeria. Data on operation time, estimated blood loss, postoperative morbidities were collected and analysed with comparison between the two groups using chi square, Fischer's exact test and t-test as appropriate.

Results: The mean operative time, estimated blood loss, transfusion rate and postoperative anemia rate were significantly less in the exteriorized group than the intraperitoneal group ($p= 0.000, 0.009, 0.048, 0.038$ and 0.028 respectively), but not in other outcome measures.

Conclusion: With shorter operative time, less blood loss and similar morbidity profile exteriorization of uterus during caesarean section seems to be preferred except where it is not possible because of adhesions and surgeons inexperience.

Keywords: Caesarean section, Uterine closure, Exteriorisation, Maternal morbidity, Neonatal outcome, Intraperitoneal.

Résumé

Arrière - Plan: Le sans danger de la technique d'extériorisation utérine pendant la césarienne, bien qu'elle soit à la mode parmi des obstétriciens, demeure toujours controversé.

Objectif: Evaluer l'influence d'extériorisation d'utérus au cours de l'intervention chirurgicale utérine sur la morbidité césarienne.

Méthode: Etude comparée randomisée des 136 femmes qui ont subi accouchement césarien primaire à l'Hôpital des spécialistes d'Havana, Lagos, Nigeria. Les données pendant le moment de l'intervention chirurgicale, la perte du sang estimé, morbidités postopératoire ont été recueillis et analysés par rapport aux deux groupes avec l'utilisation de chi square, test exact de Fisher et t-test comme il est approprié.

Résultats: Le temps moyen opératoire, la perte estimée du sang, le taux de la transfusion et la taux anaemia postopératoire étaient remarquablement moins chez le groupe extériorisé plus que le groupe intrapéritoine ($P = 0,000; 0,0009, 0,048, 0,038$ et $0,028$ respectivement) mais pas chez les autres mesures des résultats.

Conclusion: Avec le temps opératoire bien bref, moins de la perte du sang et profil de la morbidite pareil, extériorisation du utérus pendant la césarienne semble être préféré sauf dans

le cas ou ce n'est pas possible a cause d'adhésions et l'inexpérience des chirurgiens.

Introduction

The technique of uterine exteriorization at caesarean section though popular among obstetricians, its safety remains controversial^{1,2}. While the advocates believe that exteriorization of the uterus facilitates repair of uterine incision by not only improving access, but also reduces blood loss by compression of uterine blood vessels; others believe that it is fraught with dangers of intraoperative haemodynamic instability, post operative pain, puerperal pyrexia, endometritis, urinary tract infection, wound infection, increased blood loss, pulmonary infection and embolism^{2,3,4}.

These reports have been variously criticized for poor methodology and power^{1,5}. Equally all these reports are from the Caucasian population.

The aim of this study was to compare the influence of uterine exteriorization at caesarean section vis-à-vis intraperitoneal repair on the caesarean morbidity in an African population.

Patients and Methods

Women undergoing primary caesarean section for various indications at Havana Specialist Hospital Lagos, Nigeria during the period 1st July 2000 to 30th June 2002.

Havana Specialist Hospital is located in the Nigerian foremost city of Lagos. The hospital is a multi-disciplinary hospital catering to the upper socioeconomic strata of the society. There are no restrictions in the type or range of patients accepted but the relatively high cost of services practically excludes lower and middle social class.

The exclusion criteria includes patient with antepartum haemorrhage, previous caesarean section, multiple pregnancy, ruptured uterus, prolonged rupture of membrane, haemoglobin of less than 11g/dl, prolonged obstructed labour, clinically palpable fibroid and failed exteriorisation when the case is already randomised to exteriorisation group.

Ethical clearance was obtained from the institution's ethical committee before the commencement of the study.

Before the commencement of the study, the minimum sample size and the duration of the study were determined. The duration of the study is to be extended if the minimum sample size is not reached.

The women recruited into the study were assigned randomly to one of two methods of repair of uterine incision at caesarean section using a computer generated random sampling method, after subjects' informed consent had been obtained.

All the surgeries were through a Pfannenstiel skin incision and lower segment caesarean section. The uterine inci-

*Correspondence

sions were closed in two layers using chromic catgut (ccg) suture size 2, followed by ccg suture size 00 for the peritoneal layers. The rectus sheet was closed continuously using ccg suture size 1 and plain ccg suture size 00 for the apposition of subcutaneous layer. The skin was closed subcuticularly with nylon suture size 0. The only difference between the two groups was on the method of closure of uterine incision i.e. intraperitoneal closure or closure after temporary exteriorisation.

Intraperitoneal closure

After delivery of the baby and the placenta, the uterine incision is closed with the uterus within the abdominal cavity.

Closure after temporary exteriorisation

Unlike in the in situ closure, after delivery of the baby and the placenta the uterus is delivered through skin incision outside the anterior abdominal wall and the repair of uterine wound effected while the uterus is outside the abdominal cavity. After repair of the uterus and reperitonealisation of the lower segment, the uterus is returned to the abdominal cavity and the anterior abdominal wall repaired as above. In cases where the uterus could not be delivered, the patient was excluded from the study.

All the patients had extended prophylactic antibiotics of ampicillin, gentamicin and metronidazole for five days. Urinary catheter was removed 24 hours after surgery.

The surgical wounds in all patients were inspected on postoperative day three and thereafter all wounds were left open. The subcuticular nylon stitches were removed on postoperative day five and patients discharged on the postoperative day six except where postoperative complications necessitated extended hospital stay.

Data on the operation time (skin incision to skin closure time) estimated blood loss (by the consultant anaesthetist

who was not aware of the on going study), postoperative analgesic requirement, puerperal pyrexia, wound infection, endometriosis, chest infection, total hospital stay and any other postoperative complication noted. The collected data was analyzed with comparisons between the two groups using chi-square with Yates correction, Fischer's exact test and student's t-test as appropriate. The odds ratio and the 95% confidence interval were obtained where appropriate. A p value <0.05 was considered significant.

Definition of terms

For the purpose of this study

Wound infection shall be defined (clinically) by the presence of one or more of the following:

1. Sero - sanguinous
2. Induration, erythema and / or pain
3. Obvious wound dehiscence (partial or total)

Endometritis shall be defined as the occurrence of at least two of the following:

1. Soft and tender uterus
2. Foul smelling lochia
3. Cervical motion tenderness
4. Culture of pathogenic organism from the endocervical swab.

Results

The characteristics of the women in the two groups are shown in Table I are comparable with regards to age, parity and gestational age.

Three patients who were originally scheduled for temporary exteriorization but whose uterus could not be delivered because of severe adhesion were managed as in situ group. Also in six patients in the in situ group, the uterus was exteriorized in order to obtain better view and hold on the lower uterine segment to control bleeding. This nine patients were excluded from the analysis of maternal outcome.

The outcome measures are shown in Table 2. The mean operation time and estimated blood losses were significantly higher in the in situ repair group than the exteriorisation group. Eleven (17.7%) women in the in situ group were transfused intraoperatively because of postpartum haemorrhage as against three (4.6%) patients in the exteriorisation group. Also the number of women with postoperative anaemia was significantly more in situ group (21.0%) compared to the exteriorisation group (6.2%); X² =

Table 1 Sociodemographic characteristics of the 127 patients

Variables	In situ group N = 65	Exteriorisation group N = 62	T Value	P Value
Mean age (years)	29.1 ± 4.5	29.3 ± 4.8	1.632	0.107
Mean parity	2.7 ± 1.5	2.6 ± 1.6	.903	0.370
Mean gestational Age at delivery	38.5 ± 2.0	38.4 ± 2.1	1.817	0.083

Table 2 Maternal outcome in the two groups

Variables	Exteriorisation group (65)	In situ group (62)	t or x ² values	P value	Odds ratio	95% confidence interval
Mean operation time (mins)	33.57 ± 5.67	38.36 ± 5.8	12.124*	0.000	-	-
Mean estimated blood loss (ml)	742.0 ± 328.9	872.0 ± 270.3	5.148*	0.009	-	-
Transfusion rate	3(4.6%)	11(17.7%)	4.32⊕	0.038	0.22	0.05 - 0.94
Postpartum anaemia (Haemoglobin <11.0g/dl)	4(6.2%)	13(21.0%)	4.8 ⊕	0.028	0.25	0.06 - 0.89
Wound infection	7(10.8%)	5(8.1%)	0.05⊕	0.82	1.38	0.36 - 5.36
Endometritis	3(4.6%)	5(8.1%)	0.19 €	0.33	0.55	0.10 - 2.82
Puerperal pyrexia	7(10.8%)	9(14.5%)	0.14 ⊕	0.71	0.71	0.22 - 2.25
Mean analgesic requirement	5.7 ± 1.2	5.6 ± 1.4	.263*	0.799	-	-
Mean hospital stay (days)	6.8 ± 1.9	6.8 ± 2.0	.494*	0.625	-	-
Hospital bill (\$1 = #135)	\$1114.68 ± 126.64	\$1122.75 ± 133.5	1.764*	0.098	-	-
Failed procedure	3(4.6%)	6(8.8%)	0.47€	0.24	0.47	0.09 - 2.24

⊕ = chi square (x²); * = t test (student's t-test); € = Fisher's exact test

4.8: $p=0.028$.

The wound infection rate among the in situ group of 8.1%(5) was lower than 10.8%(7) in exteriorization group, however it was not statistically significant ($X^2 = 0.05$; $p=0.82$).

In the other maternal outcome measures of endometritis (4.6% Vs 8.1%), average hospital stay (6.8 ± 1.9 Vs 6.8 ± 2.0 days), average hospital bill ($\$1114.7 \pm 126.6$ Vs $\$1122.8 \pm 133.5$) and analgesic requirement (5.7 ± 1.2 Vs 5.6 ± 1.4) there were no statistically significant difference between the two groups (Table 2).

Discussion

While Edi- Osagie¹, Hershey and Quilligan² reported similar blood loss and duration of surgery, we were able to demonstrate that exteriorisation shortens duration of surgery and also reduces blood loss. This is in agreement with general belief of most obstetricians¹. With the exteriorisation of the uterus, the lower uterine segment is made more accessible, while the traction pressure on the uterus acts as tourniquet on the uterine vessels. The combined effect of accessibility and reduced blood loss makes it easier for the surgeon to operate without hindrance thus increasing his speed unknowingly. This translates to a shorter operation time. Also it was confirmed that the intraperitoneal group had a higher blood loss; eleven patients in this group requiring transfusion intraoperatively as against three patients in the exteriorisation group.

Though Hershey and Quilligan² reported similar blood loss in the two groups, they contradicted this finding in the same study by recording higher rate of mean haematocrit drop in the intraperitoneal group than the exteriorisation group. This contradiction might be due to error in estimating blood loss by surgeons. Wilcox et al reported this difficulty/bias of estimating blood loss at caesarean section⁶. It is well known in theatre circles that while anaesthetists overestimate blood loss, surgeons underestimate. We attempted solving this problem in our study by using the estimate of one anaesthetist who was not aware of the study, a surgeon who is comfortable with both methods and had no preference for any method and excluded other surgeons because of the preference to one of the two methods. We achieved synchronicity of the two methods of blood loss estimation. In consonance with the finding on blood loss there were higher drop in mean haematocrit in the in situ (21.0%) than the exteriorisation group (6.2%) $X^2 = 4.8$ $p=0.028$.

Like other studies¹⁻⁵ there were no differences between the groups in duration of hospital stay, hospital bill, rates of puerperal pyrexia and infectious morbidity.

Though Vartiker⁷ et al reported chest pain among their patients who had exteriorisation of uterus during caesarean section, we like Edi-Osagie et al¹ did not document any case of chest pain as a result of exteriorisation in our study. Their finding of chest pain might be related to patient and anaesthetic methods rather than the exteriorisation of uterus.

In conclusion, with similar morbidity profile, but shorter operation time and less blood loss, exteriorisation of uterus during caesarean section seems to be preferred except where it is not possible because of adhesions and surgeons inexperience.

References

1. Edi-Osagie ECO, Hopkins RE, Ogbo VO et al.: Uterine exteriorisation at caesarean section: Influence on maternal morbidity and mortality. *British Journal of Obstetrics and Gynaecology*.1998; 105:1070-1078.
2. Hershey DW and Quilligan EJ: Extraabdominal uterine exteriorisation at caesarean section. *Obstet. Gynecol*.1978; 52: 189-192.
3. Magann EF, Dodson MK, Albert JR et al.: Blood loss at time of caesarean section by method of placental removal and exteriorisation Vs insitu repair of uterine incision. *Surg Gynecol Obstet*.1993; 177:389-392.
4. Stock RJ and Skellion H: Fatal pulmonary embolism occurring two hours after exteriorisation of the uterus for repair at caesarean section. *Military Medicine*.1985; 150: 549-551.
5. Enkin MW and Wilkinson C: Uterine exteriorisation Vs intraperitoneal repair at caesarean section. In: Neilson JP, Crowther CA, Hodnett ED Hofmeyer GJ and Feirse MJNC (editors). *Pregnancy and childbirth module of Cochrane data base of systematic reviews (issue1)*. London. BMJ publishing group.1997.
6. Wilcox CF, Hunt AB and Owen CA: The measurement of blood loss during caesarean section. *Am J Obstet Gynecol* 1959; 77:772-779.
7. Vartikar JV, Johnson MD and Datta S: Precoital Doppler monitoring and pulse oximetry during caesarean delivery: detection of venous air embolism. *Regional anaesthesia* 1989;14:145-148.