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Maternal Morbidity After
Emergency Caesarean, Section With
and Without Ruptured Amniotic
Membranes

A Thesis
Submitted in Partial fulfillment of the Requirement for
the Degree

Of
Doctor of Medicine
General Practice & Emergency Medicine
Tribhuvan University, Institute of
Medicine
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By
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Based on the study conducted at B.P.Koirala Institute of Health Science
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Under Department of General Practice & emergency medicine Tribhuvan
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CERTIFICATE



This is certify that the thesis of Dr.Anu Kushwaha on “ Maternal Morbidity after Emergency Caesarean Section with and without Ruptured Amniotic Membranes “for the degree of MD in General Practice and Emergency Medicine was conducted in Department of Gynaecology & Obstetrics, B.P. Koirala Institute of Health Sciences, Dharan, Nepal. This work has not been submitted previously to this University or any other Examining Body.

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CERTIFICATE

This is to certify that the thesis of Dr. Anu Kushwaha on "Maternal Morbidity after Caesarean Section with and without Ruptured Amniotic membranes" for submission to Institute of Medicine, Tribhuvan University, Kathmandu, Nepal in partial fulfillment of the requirement for the degree of M.D. in General Practice and Emergency Medicine under my direct supervision and guidance. The work done in connection with this thesis has been carried out by the candidate herself and is genuine.

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This is to certify that the thesis of Dr. Anu Kushwaha on “Maternal Morbidity after Caesarean Section with and without Ruptured Amniotic membranes” for submission to Institute of Medicine, Tribhuvan University, Kathmandu, Nepal in partial fulfillment of the requirement for the degree of M.D. in General Practice and Emergency Medicine in the my Department of Gynaecology And Obstetrics. The work done in connection with this thesis has been carried out by the candidate herself and is genuine.

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DECLARATION

This is to declare that the study on "Maternal Morbidity after Caesarean section with and without ruptured Amniotic Membranes" is done by me and is original.



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DEDICATED

TO

MY

FAMILY

AND

PARENTS



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INTRODUCTION

Caesarean section is the delivery of a foetus through a surgical incision through the abdominal wall (laparotomy) and uterine wall (hysterotomy) (1). In the United States of America, caesarean delivery has become the most common surgical procedure. By the early 1990, almost 25% of all live births were by caesarean section. In BPKIHS the rate of caesarean section in 1999-2000 was 17.4% and in 2000-2001 was 18% of total deliveries. This is higher than reported in Indian studies(2) and lower than the rate in 1999 (23.5%) quoted by Richard H. Paul et al for the United States of America.(3) The most frequent indications for caesarean section include foetal distress, failure to progress in labour, breech presentation, previous caesarean section, contracted pelvis and cephalic pelvic disproportion(1).

The caesarean delivery rate is higher in nulliparous women and with increasing maternal age. Therefore, reduced parity and the increase in the women delaying childbearing into their 30s and 40s may be another reason for the increasing caesarean section rate in the United States(4,5,6).

Worldwide, maternal morbidity has decreased dramatically in the past 50 years (1). In Nepal maternal mortality has also decreased from an estimated 1500 per 1,00,000 live births in 1996 (7) to 415 per 1,00,000 live births in 2001/2002 (8). However, this still places Nepal as having one of the highest maternal mortality rates in the world. The main causes of maternal mortality in Nepal are still postpartum haemorrhage (47%), obstructed labour (16%), eclampsia (14%), puerperal sepsis (12%), abortion (5%) and other (6%) in 2002(8). Few studies have been published reporting operative mortality in caesarean section in Nepal, however, worldwide the major sources of operative mortality in women undergoing caesarean delivery were anaesthetic accidents, haemorrhage and infection (1). "However with improved anaesthetic techniques and training, the availability of antimicrobial agents and modern blood banking techniques, death from aspiration, infection and haemorrhage are much less common."(1) Thromboembolism is the major cause of death following caesarean section in the United States of America and there is still significant morbidity associated with caesarean section. The post caesarean section complications that bring about morbidity in the post operative period are puerperal fever, wound infection, endometritis, urinary tract infection, deep vein thrombosis,

breast infection and post-partum hemorrhage (1). Morbidity is also increased in obese patients (9,10,11,12). In a study done in Parkland Hospital in the United States, without prophylactic antimicrobial therapy, 85% of women in labour with membranes ruptured for longer than 6 hours who underwent caesarean section developed serious infection, where as with intact membranes it was only 30% (1). This study measures the rate of infection following rupture of membranes and intact membranes for women who come to emergency caesarean section in the B.P. Koirala Institute of Health Sciences, Dharan, Nepal. All patients in this study received antimicrobial therapy after caesarian section.

LITERATURE REVIEW

The indications for caesarean section are broadly divided into two categories: absolute and relative. Absolute indications are central placenta praevia, severe degree of contracted pelvis, cervical fibroid, vaginal atresia and advanced carcinoma of the cervix.

Relative indications are cephalo-pelvic disproportion and contracted pelvis, previous uterine scar, foetal distress, abnormal uterine contraction, antepartum haemorrhage, malpresentations, a bad obstetric history, hypertensive disorders, failed induction, elderly primi gravidae and medical-gynaecological disorders(13).

Types of caesarean section include-

- 1) Lower segment caesarean section, (the most commonly performed procedure).
- 2) Classical caesarean section, (has a very limited scope in present day).
- 3) Extra peritoneal caesarean section, performed only in exceptional circumstances.

I. INFECTION AND POST CAESAREAN MORBIDITY

1. Urinary Tract Infection :

“The second most common etiology for postcaesarean febrile morbidity is urinary tract infections. The incidence of urinary tract infections is increased in patients with diabetes, those who have other comorbidities and those who have a longer duration of use of indwelling catheters.” (13) Leigh et al studied the incidence of post operative urinary tract infection in women undergoing caesarean section over two separated periods of time. In those patients who were catheterized, it was found that 34% developed bacteriuria in 1985 and 25% in 1987. The incidence of bacteriuria was decreased by improving catheterization techniques. In spite of this bacteriuria, only a small number (2% and 6% respectively) of patients developed microbiologically proven urinary tract infections by the fifth day. Therefore, bacteriuria alone after catheterization at caesarean section is not a good indicator of urinary tract infection risk, and appropriate antibiotic management is better determined by a urine culture on the fifth day.(14)

2. Other Infections :

Suonio et al analysed the risk factors for postoperative fever, endometritis and wound infection in 761 consecutive caesarean sections. Post operative fever was observed in 12%, endometritis in 4.7% and wound infection in 3% cases (15). Emmons et al found that wound infection is a serious complication that significantly increases postoperative morbidity, hospital stay and cost. In his study approximately 5% of women undergoing caesarean section developed wound infections (16). Febrile morbidity after caesarean section has been reported at widely variable rates from 27% to 85% in the United States,

“largely because of different risk factors among diverse patient population”(16). Soper et al found that approximately 20% of patients undergoing caesarean section and 1% of patient delivering vaginally will develop postpartum endometritis (17).

Emmons et al found that the determinants of wound infection after other abdominal surgery included bacterial contamination from the intestinal tract, patient age, duration of operation, duration of postoperative hospitalization, use of drains and obesity. Several of the factors peculiar to an increase in caesarean section wound infection are amniotic fluid bacterial contamination

before surgery, duration of labour, duration of rupture membranes, the number of vaginal examinations, length of internal foetal monitoring and surgery as a result of labour dystocia (16).

The highest rate of febrile morbidity has been reported among women undergoing primary caesarean section after the onset of labour and usually after the rupture of membranes. Caesarean section performed in the second stage of labour was particularly correlated with an increased rate of wound infection (16). Direct wound factors, such as obesity and the use of abdominal drains were also the contributing factors to the rate of wound infections (11,12,16). Honor et al, Ahren et al, Maeder et al and Hodgkinson et al established that the obese patients are at increased risk for other operative complications, especially the urinary tract infection, increased blood loss, aspiration and pulmonary embolism (9,10,11,12).

Vaginal organisms contaminate the endometrium during labour and seem to cause the majority of postpartum endometritis and abdominal wound infection. Suonia S. et al reported 25% of the wound infections in their study were due to Staph. Aureus. This organism does not usually originate from the endometrium and so must be iatrogenically introduced (15). Suonio et al also reported that the relative risk for postoperative fever was increased in

cases with postoperative haematoma, and blood loss greater than 500 ml (15).

Cooperman et al reported their experience with 73 patients who underwent amniotic fluid and amniotic membrane culture at caesarean section. They established that when the membranes were intact and labour was not present, few organisms were recovered from the amniotic fluid. If the labour was established with intact membrane however, both commensal and pathogenic anaerobes were frequently recovered from the amniotic fluid, but no aerobes were recovered. When the membranes were ruptured and labour had occurred, aerobes, anaerobes and commensals were recovered from the amniotic fluid (18,19).

3. Indications For Prophylactic Antibiotics :

Emmons et al found the mean rate of wound infection after caesarean section was 10% among women not receiving prophylactic antibiotics and was 3% in women who did receive antibiotic prophylaxis after caesarean section (16,20). Filler et al found that "the prophylactic use of antibiotic reduces the risk of postoperative infection complication after caesarean section even in the population at lowest risk". (21,22).

It is common practice for the patient with postpartum endometritis to put on continuous intravenous antibiotics until they have been afebrile for 24-48 hours after which they are switch over to oral antibiotics and observed in the hospital for an additional 24 hours before discharge . Soper found that this infection is generally treated with combination of broad spectrum antibiotics (17). One study done by John et al showed that the use of antibiotic lavage at caesarean section was quite advantageous as it would offer the most inexpensive method of prophylaxis (2gram of cephalosporin in 1 litre normal saline) and it could potentially avoid systemic toxicity (22). It has long been established that using a sterile technique in the operating room, appropriate wound care and infection control in the hospital ward reduces post operative infection (15).

4. Other Post Operative Complications Contributing To Post Caesarean Section Morbidity :

4.1 Reactionary Haemorrhage:

Reactionary haemorrhage occurs within 24 hours of the surgery. It is mainly due to slipping of a ligature, dislodgement of a clot or cessation of reflex vasospasm (24). The precipitating circumstances include:

- the rise in blood pressure and refilling of the venous system on recovery from shock.
- restlessness, coughing and vomiting which raise the venous pressure (26)

4.2 Paralytic Ileus :

Paralytic ileus is defined as a state in which there is failure of transmission of peristaltic waves secondary to neuromuscular failure. The resultant stasis leads to accumulation of fluid and gas within the bowel with associated distention, vomiting, absence of bowel sounds and absolute constipation. Postoperative ileus following caesarean section usually occurs after an abdominal approach (rather than Pfannenstiel) and is self-limiting with a variable duration of 24-72 hours. Postoperative ileus may be prolonged in the presence of hypoproteinaemia, metabolic abnormality or sepsis (24).

4.3 Breast Problems :

For the first 24-48 hours after the development of the lacteal secretion, it is unusual for the breast to become distended, firm and nodular. Puerperal fever from breast engorgement is common. Almeida and Kitay reported that 13% of all postpartum women had fever from this cause and it ranged from 37.8 to 39 degree Centigrade. Fever seldom persists for longer than 4-16 hrs. (25)

4.4 Deep Vein Thrombosis :

The signs and symptoms of deep vein thrombosis, involving the lower extremity vary greatly, depending upon the degree and the intensity of the inflammatory response. Thrombosis typically involves much of the deep venous system from the foot to the iliofemoral region. Rammi et al found that acute blood loss during operation, chronic blood loss post operatively and anaemia are known to significantly increase the post operative platelet count and cause thromboembolism after caesarean section .Postoperative reactive thrombocytosis which has been implicated in the genesis of thromboembolism was demonstrated after a variety of surgical procedures and also in caesarean section (26). The risk of developing thrombus increases 3-5 times more with caesarean section. Other risks include obesity advanced maternal age higher parity and poor post operative ambulation (13).

II. Morbidity And Operative Technique :

Oliver et al in the study of 113 caesarean section, reported shorter operation time, less oral analgesics and less bowel stimulants administered when the visceral and parietal peritoneum were left open, no adverse effects on immediate post-operative and recovery were found (27). This has been

confirmed in a recent study by Sood in which febrile morbidity was reduced in the non closure of the parietal and visceral peritoneum. Other infective morbidities were not affected (28). Jonathan et al suggested that "caesarean section is performed optimally with an adequate surgical incision and that the Maylard incision is a safe option which should be strongly considered when risk factors....demand maximal surgical exposure for non-traumatic abdominal delivery" (29). The Misgav Ladach method for caesarean is useful. "It gives quicker recovery, less use of post operative antibiotics, antifebrile medicine and analgesics. There is a short anaesthesia and shorter working time for the operative team and it is suitable for both emergency and planned operation" (30,31).

AIMS AND OBJECTIVES

1. General objectives:

Maternal morbidity after emergency caesarean section with intact amniotic membranes and ruptured amniotic membranes.

2. Specific objectives:

- a) To see the differences in maternal morbidity in patients following emergency caesarean section with intact membranes and ruptured membranes.
- b) To see the difference in morbidity when section is done in the latent phase and active phase of labour.
- c) To see the differences in maternal morbidity after caesarean section in relation to the duration of ruptured membranes.

RESEARCH HYPOTHESIS

The research hypothesis is that emergency caesarean section done after the amniotic membrane has ruptured is associated with increased maternal morbidity.

MATERIALS AND METHODS

A. Type of Study:

This was a prospective and descriptive study

B. Study period:

November 2002 to April 2003 (6 months)

C. Place of study:

Department of Obstetrics and Gynaecology, B. P. Koirala Institute of Health Sciences, Dharan, Nepal.

D. Population of study:

100 consecutive cases presenting for emergency caesarean section.

E. Inclusion criteria:

All patients of emergency caesarean section in the time period were included in the study. Patient complications were recorded in the period from operation until suture removal (usually the seventh day), whether they came

for routine follow up after discharge, stayed as inpatients or were readmitted with complications.

F. Exclusion criteria:

1. Heart disease, diabetes mellitus, pulmonary tuberculosis, chronic renal disease.
2. Immuno-compromised patient.
3. Patient with diagnosis of chorio-amnionitis before caesarean section .

G. Study design:

1. A consecutive 100 patients undergoing emergency caesarean section were enrolled in this study
2. A pre-designed questionnaire was filled for the patient before transferring to the operation theatre.

This questionnaire included the patient's basic identification, details of current and previous pregnancy, labour event and indication for caesarean section. These patients were followed up until the time of discharge to detect the maternal morbidities.

3. The following maternal morbidities were studied
- a. Puerperal fever - the postpartum woman whose temperature persists at 100.4 degree Fahrenheit after 24 hours following operation was evaluated because incisional abscesses following a caesarean section are usually indicated by fever beginning on or about the 4th postoperative day (1).
 - b. Urinary tract infection - urinary tract infection is difficult to distinguish from a pelvic infection. In the typical case bacteriuria (more the 10⁵ bacteria in 1 ml of urine in BPKIHS lab), pyuria (more than 5 pus cells in HPF in BPKIHS lab), costovertebral angle tenderness and spiking temperature clearly indicating the presence of a urinary tract infection(1).
 - c. Deep vein thrombosis - the diagnosis of deep vein thrombosis is suspected by finding calf tenderness, a swollen leg, pain and occasionally femoral triangle area tenderness with elevation of temperature (1).
 - d. Breast infection - for the first 24 hours after the development of the lacteal secretion, it is not unusual for women to develop

some fever. The fever of bacterial mastitis develops later and usually is sustained and it will be associated with other signs and symptoms of breast infection (1).

e. Postpartum haemorrhage - postpartum haemorrhage is defined as the loss of 500 ml or more of blood after the vaginal delivery and more than 1000 ml after caesarean section delivery 1. Haemorrhage after the first 24 hours is defined as late postpartum haemorrhage.

H. Data collection :

The data were entered in a Microsoft Excel spreadsheet. The result obtained was shown in the form of tables.

I. Methodology :

All relevant information regarding patient were documented on a pre-structured proforma.

RESULT

In this study 100 consecutive women undergoing emergency caesarean sections were included. The study was done for six months (Nov 2002 to April 2003) duration in the Department of Obstetrics and Gynaecology at B.P.Koirala Institute of Health Science, Dharan, Nepal.

The study was divided into two groups. One group, (Gr.I), consisted of patients undergoing emergency caesarean section with intact amniotic membrane at the time of admission and other group (Gr.II) were patients undergoing emergency caesarean section with ruptured amniotic membrane at the time of admission. Gr.I included 72 patients and Gr.II included 28 patients.

Table -1 Age of the patients (n=100)

Age group	Gr.I (n=72)	Gr.II (n=28)
15 - 19 yrs	6	6
20 - 24 yrs	38	10
25 - 29 yrs	20	9
30 - 34 yrs	6	2
35 - 39 yrs	1	1
> 40 yrs	1	0

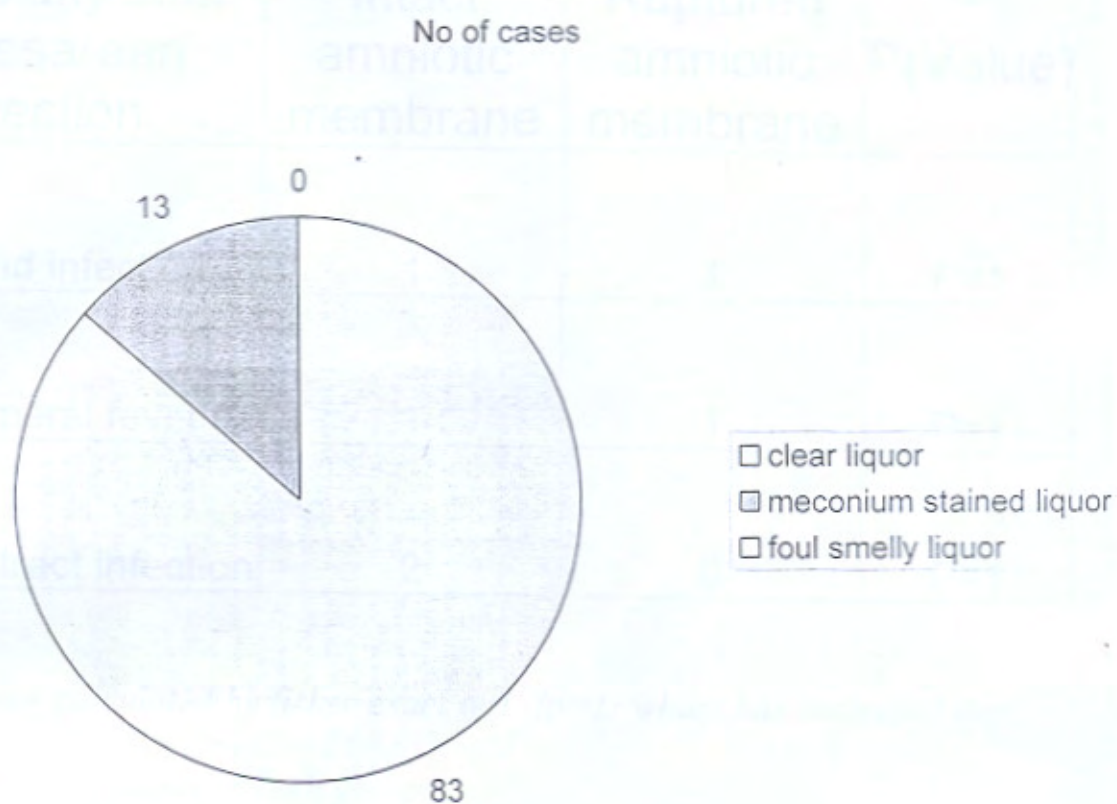
Most women in the study were from the 20-29 years of age group and most of them were primipara.

Table -2 Duration of leaking of amniotic fluid per vaginum before caesarean section (n=100)

Duration of time (in hrs)	No of cases
0 - 3 hrs	60
3 - 6 hrs	4
6 - 12 hrs	11
12 - 24 hrs	15
> 24 hrs	10

In this study more than 90% of patients had ruptured membranes for less than 24 hrs before surgery.

Table -3 Characteristics of the liquor (n=96)



Character of amniotic fluid discharged per vaginum was consistent with non infected amniotic fluid in all cases. In 13 patients it was suggestive of foetal distress as meconium was present. In 4 patients characteristic of the amniotic fluid could not be assessed as they presented with antepartum haemorrhage and per vaginal examination was not done..

Table 4 -Post operative infection complications

Morbidity after caesarean section	Intact amniotic membrane	Ruptured amniotic membrane	P(Value)
wound infection	1	1	P=1
puerperal fever	1	1	P=1
urinary tract infection	2	0	P=1

P value was calculated by fisher exact test (p=1) which has indicated that there is no significance in both groups.

Among the post operative complications observed in this study puerperal fever occurred in one patient from each group. The patient from Gr.I who developed puerperal fever presented in the latent phase of labour, had no leaking per vaginum before surgery, had clear liquor at operation and the caesarean section was done for foetal distress. This patient developed discharge from the wound on fifth postoperative day. The blood culture

grew streptococcus and the urine culture grew E. Coli. The patient was treated according to the sensitivity result.

The patient from Gr.II had leaking of clear liquor per vaginum for more than 24 hours and presented in the active stage of labour. After caesarean section the patient had not developed any post operative complication by the seventh day when skin sutures were removed and she was discharged from the hospital. On the tenth post operative day the patient developed pus discharge from the wound and was re-admitted. Pus culture grew mixed organisms, mainly staphylococcus, streptococcus and klebsiella. Patient was treated according to the sensitivity result.

Urinary tract infection was seen in two other patients of Gr.I. One patient who developed urinary tract infection, presented in the latent phase of labour and caesarean section was done for foetal distress. Routine post operative urine culture sent on third day grew streptococcus. The other patient of Gr.I who developed urinary tract infection presented in latent phase of labour and a caesarean section was done for breech presentation. E.Coli grew on the routine urine culture sent on the third post operative day. Both the patients were prescribed antibiotics according to the sensitivity results.

Other post operative complications :

No other postoperative complications, such as deep vein thrombosis, breast infection, paralytic ileus, post partum haemorrhage or reactionary haemorrhage were seen in any patients of either study group.

In summary, this study showed three patients (4.1%) with intact membranes developed infectious post caesarean morbidities. One patient had both a urinary tract infection and a wound infection with fever, and two patients developed a urinary tract infection without fever. One patient (3.5%) with ruptured membranes of greater than 24 hours and intervention in the active stage of labour developed fever and a wound infection after discharge from hospital. This higher incidence of infection in patients with intact membranes is surprising and is not supported by previous studies reported in the literature. This does not support the hypothesis of this study.

DISCUSSION

The present study was undertaken to find out if emergency caesarean section done after ruptured membrane is associated with increased maternal morbidity. This is a prospective observational case study based in a tertiary care hospital in Nepal.

It was found that urinary tract infection occurred in three cases with amniotic membranes intact where as no cases were detected in patients with ruptured membranes i.e. occurred in those at a lower risk of infection according to previous studies. Factors that could contribute to the incidence of postpartum urinary tract infection are asymptomatic bacteriuria, undetected urinary tract infection at presentation and poor aseptic technique at catheterization (14). As this current study did not record these factors, we cannot comment on the reasons for the rate of urinary tract infection found but suggest that detection of urinary tract infection at presentation and careful attention to catheterization techniques should prevent this morbidity.

In this study, puerperal fever was detected in one patient from Gr.1 and Gr.2. These finding are different to the finding of Andra et al, Sherif et al and Cooperman et al that showed that the highest rate of febrile morbidity had been reported among women undergoing primary caesarean section after the

onset of labour and usually after ruptured of membranes (16,18,19). Martti et al study suggests that more than 12 hours of ruptured of membrane not increased any further morbidity(34). The small sample size and unequal distribution of patient numbers between Gr.1 and Gr.2 does not allow us to draw any particular conclusions about these differences in outcome.

In this study it was found that wound infection occurred in 2 patients, one from each group. This finding suggests that the wound infection after caesarean section could be due to ascending infection from the vagina during labour or iatrogenically introduced during caesarean section performed in second stage of labour (15,16,). Studies have shown that prophylactic antibiotics during caesarean section decreased wound infection morbidity (17,22,23,32,33, 34). In this study all patients received antibiotics after caesarean section. This may account for the low incidence of wound infections in our patients.

The literature (27,28) suggests that nonclosure of the parietal and visceral peritoneum decreases the incidence of febrile morbidity. This association was not a point of observation in this study.

The patient in Gr.1 who developed puerperal fever presented in latent phase of labour and blood culture grew streptococcus. The patient in Gr.2 who developed puerperal fever presented in the active stage of labour and more than 24 hours of leaking per vaginum. Her blood culture grew staphylococcus, streptococcus and klēbsiella. These comparison shows that the longer the duration of rupture of amniotic membranes and intervention in the active stage of labour are increased risk factors for the development of post partum infections. This is the similar to the findings in the study done by Sherif (19) and others.

The number of patients was unequal in these two groups because this is a consecutive observational study and implies that the natural incidence of people presenting for emergency caesarean section with intact membranes is higher than those presenting with rupture membranes. However, the sample studied was small and generalizations should not be made about the population as a whole on such small numbers.

SUMMARY

- 1) This study was based on the clinical observation and questionnaire answers recorded for 100 consecutive patients going to emergency caesarean section.
- 2) This study was undertaken for six months duration from November 2002 to April 2003 in BPKIHS, Dharan, Nepal.
- 3) Patients were divided into two groups; those women with intact amniotic membranes at presentation (Gr. I) and those with ruptured amniotic membranes at presentation (Gr. II). The first group included 72 patients and the second group included 28 patients. Most of them were aged between 20 -29 years of age.
- 4) In this study ninety percent of women with ruptured membranes patients were leaking liquor for less than 24 hours.
- 5) In this study two patients developed puerperal fever, four cases of post operative infectious complications were observed; three cases of urinary tract infection with ruptured membranes and one case in each group developed a wound infection. One of the patients with intact

- 6) membranes developed both a wound infection and a urinary tract infection.
- 7) The incidence of urinary tract infection post operatively was unexpected and so risk factors particularly related to urinary tract infections had not been recorded.
- 8) No non infectious post operative complications were seen.

CONCLUSION

This study's hypothesis is that emergency caesarean section done after ruptured membranes is associated with increased maternal morbidity. However, in this study it was observed that most postoperative morbidity was found in those patients with intact membranes (4.1% compared to 3.5%). The small numbers found may not in fact be a significant difference. The incidence of urinary tract infections suggests that closer monitoring of urine for bacteriuria before caesarean section would be helpful in decreasing post operative infectious morbidity.

REFERENCES

- 1) Cunningham Gant N.F, Leveno K.J., "Caesarean section postpartum hysterectomy", *Williams Obstetrics*, 21st edition, Mc Graw Hill, Dallas, 2001, pp. 238-253.

- 2) Mishra US, Ramanathan M. "Delivery related complication and determination of caesarean section rate in India", *Health Policy Plan* 2002, Mar, 17(1): 90-98.

- 3) Richard H.P. and David A. M. "Caesarean birth: How to reduce the rate". *Obstetrics and Gynaecology*, June 1995, 172 (6): pp. 1903-1907.

- 4) Marvin L.H, Michael J.H, William E.H and Charles B.H, "Changing Rate of Cesarean Section Delivery: The Duke Experience, 1978-1986", *Obstetrics and Gynaecology*, 1 July 1988.72 (1): pp. 98-100.

- 5) Julian L, Salvador P, Soledad M. C . “Inter-hospital variation in cesarean section. A risk adjusted comparison in the Valencia public hospitals”, *Journal of Epidemiology and Community Health* 2000 ,54: 631-636

- 6) Patricia H.S, Donald M. and George G. R. “Reasons for the Rising Cesarean Delivery Rates, 1978-1984”, *Obstetrics and Gynaecology*, May 1987, 69(5): pp. 696-700.

- 7) “Unicef the progress of nations “. Health in Nepal, Realities and challenges. Resource center of primary health care Kathmandu.1995 pp-1.

- 8) “Safe motherhood”. Annual report Department of health service. Kathmandu 2001 pp-82

- 9) Honor M, Thomas L.G, Robert J, Sidney F. and Karen L. T.
"Determinants of Morbidity in Obese Women Delivered by Cesarean section", *Obstetrics and Gynaecology*, May 1988 Vol. 71(5) 691-695.
- 10) Ahern J.k, Goodlin R.C:" Caesarean section in massively obese".
Obstet Gynaecol 51: 509, 1978
- 11) Maeder E.C, Barno A, Mecklenburg F: "Obesity: A maternal high risk factor", *Obstet Gynaecol* 45: 669, 1975.
- 12) Hodgkinson R, Husain F.J: "Caesarean section associated with gross obesity", *Br. J Anaesth* 52: 919, 1980
- 13) *Caesarean section*, <http://www.medceu.com/course-no-test.cfm?CID=349>, accessed 16/6/03

- 14) Leigh DA, Emmanuel FX, Sedwick J, Dean R., " Post-operative urinary tract infection and wound infection in women undergoing caesarean section: a comparison of two study period in 1985 and 1987", *J Hosp Infect.* 1990 Feb: 15(2):107-116.
- 15) Suonio S., Saarikoski S, Vohlonen I.,Kauhanen O. "Risk factors for fever, endometritis and wound infection after abdominal delivery", *International Journal of Obstetrics and Gynaecology*, 1989 June,29(2): pp. 135-142
- 16) Andra L.E, Marijane K, Marianne J, David A. E. "Development of Wound Infections Among Women Undergoing Cesarean Section", *Obstetrics and Gynaecology*, 1988 Oct, 72(4): pp. 559-564.
- 17) David C, Monica S. R, Edwin H. "Prophylactic use of antibiotics for non laboring patients undergoing cesarean section delivery with intact membranes: A meta-analysis". *Obstetrics and Gynaecology*, March 2001 vol. 184 number 4.

- 18) Cooperman N, Karim M, Rajashekaralah k:” Clinical significance of amniotic fluid, amniotic membranes and endometrial biopsy cultures at the time of caesarean section. *Am J Obstet Gynaecol*, 1980 137:536
- 19) Sherif G. A, Richard P. P. and Lane J. M. “Significance of Endometrial Cultures Performed at Cesarean Section”. *Journal of Obstetrics and Gynaecology*, Aug 1986, 68 (2): pp. 220-225
- 20) Smaill F, Hofmeyr G. J. “Antibiotic prophylaxis for cesarean section” (Cochrane Review): *The Cochrane Library*, Issue 1, 2002. Oxford: Update software.
- 21) Filler L, Shipley CF, Dennis EJ, Nelson GH. “Postcesarean endometritis; a brief review and comparison of three antibiotics regimens”, *J.S.C .Medical Association* 1992 Jun 88 (6); pp. 291-295.
- 22) David C., Monica S.R. and Edwin H.” Prophylactic use of antibiotics for non labouring patients undergoing caesarean delivery with intact membranes”, *Am J Obstet and Gynaecol*, March 2001 pp. 656-61.

- 23) John P. E. and James F. F.” Comparison of Lavage or Intravenous Antibiotics at Cesarean Section”. *Obstetrics and Gynaecology*, Jun 1986 67 (1): pp. 29-31.
- 24) Russell R.C.G, Norman S, Williams and Christopher J.K. Bailey and Love’s Short Practice of Surgery. 23rd ed pp.755, 1073
- 25) Almeida OD, Kitay DZ, “Lactation suppression and puerperal fever”, *American Journal of Obstetrics and Gynaecology*, 154: 940, 1986.
- 26) Rammi K. A, John R. T, Christina A. O, Stephen C. B, David J. T. “Reactive thrombocytosis after caesarean section and vaginal delivery: implications for maternal thromboembolism and its prevention”, *British Journal of Obstetrics and Gynaecology*, March, 2000 vol. 107, pp. 411-414.

- 27) Olivier I, Frank L, Francois B. "Non closure of the visceral and parietal peritoneum at caesarean section: a randomised controlled trial", *British Journal of Obstetrics and Gynaecology*, July 1996 vol. 103: pp. 690-694.
- 28) Sood A.K. "Nonclosure of Parietal and Visceral Peritoneum During Caesarean section", *J Obstet Gynaecol Ind.* Vol. 53, No.2: March /April 2003 pp. 153-57
- 29) Jonathan W.T A. and George W. M. "Surgical Incision for Cesarean Section", *Obstetrics and Gynaecology*, 1987 70 (5): 706-708.
- 30) Gunnar H, Lennart S. and Michael S. "The Misgav Ladach method for cesarean section: method description", *Acta Obstet and Gynecol Scand* 1999, 78: pp. 615-621.
- 31) Federici D, Lacelli B, Muggiasca A, Agarossi L, Cipolla L, Conti M. "Caesarean section using the Misgav Ladach method", *Int J Gynaecol Obstet* 1997: 57:273-9.

- 32) Hacker, Moore, 1998 *Essentials of Obstetrics and Gynaecology* 3rd ed- Saunders, Philadelphia pp. 354
- 33) David E. S, Catherine T. K and Wayne B. C." Abbreviated Antibiotic Therapy for the Treatment of Postpartum Endometritis", *Obstetrics and Gynaecology*, Jan 1987, 69 (1): pp. 127-129
- 34) Morrision J.C, Coxwell W.L, Kennedy B. S, "The use of prophylactic antibiotics in undergoing caesarean section", *Surg Gynaecol Obstet* 136:425, 1973
- 35) Martti R.and Carl G.N. "Risk Factors for Febrile Morbidity Associated with Caesarean Section". *Journal of The American College Of Obstetricians and Gynaecologists*, 1980 vol. 56, No. 3,Sept Pp 269-73.

APPENDICES

Questionnaire Format

DATE :

NAME :

AGE :

ADDRESS :

TEMPORARY :

PERMANENT :

OBSTETRICS FORMULA: GRAVIDA---- PARITY--- ABORTION----

LMP :

EDD :

POG :

OCCUPATION :

HUSBAND :

WIFE :

PERSONAL HISTORY- SMOKING : YES---- NO----

EDUCATION :

HUSBAND: 1. GRADUATE
2. INTERMEDIATE
3. SECONDARY SCHOOL
4. PRIMARY SCHOOL
5. NO SCHOOLING

WIFE:- 1. GRADUATE
2. INTERMEDIATE
3. SECONDARY SCHOOL
4. PRIMARY SCHOOL
5. NO SCHOOLING

HISTORY: AMENORREA-----MONTHS

PAIN-

LEAKING PER VAGINUM- YES, HOW MANY HOURS-

NO-----

LIQUOR--- COLOUR ----- SMELL-----

PREVIOUS CAESAREAN SECTION : YES----- NO-----

EXAMINATION- ANAEMIA- HAEMOGLOBIN-----g%

BUILT-

VITALS : TEMPERATURE-

PULSE-

BP-

RR-

SYSTEMIC EXAMINATION : CHEST-

CVS-

OBSTETRICAL EXAMINATION : PALPATION- FUNDAL HEIGHT----

PER VAGINUM EXAMINATION :

PER SPECULUM EXAMINATION :

LABOUR RECORD- LATENT PHASE :

BLOOD C* ACTIVE PHASE :

MEMBRANES RUPTURE-NO OF HOURS-----

INDICATION FOR CAESAREAN SECTION :

INTRA OPERATIVE COMPLICATIONS :

POST OPERATIVE COMPLICATIONS :

COMPLICATION AFTER CAESAREAN SECTION :

1. FEVER : YES---- NO-----
2. UTI : YES---- NO-----
3. BREAST INFECTION : YES---- NO-----
4. DVT : YES----- NO----
5. PPH : YES---- NO-----
6. WOUND INFECTION : YES----- NO-----

DETECTED ON DAY OF PUERPERIUM :

INVESTIGATION : HB, TC, DC

BLOOD SUGAR :

VDRL :

BLOOD C/S :

URINE RE :

C/S :

HIGH VAGINAL SWAB FOR C/S :

WOUND SWAB FOR C/S :

CONDITION OF WOUND AT SUTURE REMOVAL :

TIME OF SUTURE REMOVAL :

STATUS OF WOUND :