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# EFFECT OF ANAESTHESIA ON MORBIDITY AND MORTALITY IN EMERGENCY CAESAREAN SECTION PATIENTS IN CALABAR, NIGERIA

**A. I. ESHIET*, E. J. UDOMA ** A.D. EKANEM ** A. DADA***

**Department of Anaesthesiology ** Department of Obstetric and Gynaecology University of Calabar Teaching Hospital Calabar.*

**Summary:** The outcome of obstetric anaesthesia following emergency Caesarean sections was studied retrospectively. The study which was carried out in the University of Calabar Teaching Hospital covered the period between 1st August 1995 – 31st August 2000. The aim was to evaluate the morbidity and mortality from anaesthesia during the period under review.

Out of 1533 Caesarean sections performed 920 were emergency giving an emergency Caesearean section rate of 60%. The main indications for the emergency Caesearean sections were obstructed labour 220 (23.9%), foetal distress 193 (19.9%) and pre-eclampsia/eclampsia 142 (15.4%). General anaesthesia was employed in 555 (60.3%) while spinal was used in 365 (39.7%). Morbidity recorded in the spinal anaesthesia group were severe hypotension 110(30%), post dural puncture headache (PDPH) 46(2.6%) and transient neurologic symptoms (TNSs) 1 (0.022%). No mortality was recorded in the spinal anaesthesia group. Morbidity in the general anaesthesia group was mainly sore throat 364(65.6%) Five deaths were recorded in the general anaesthesia group. Four deaths occurred probably due to hypoxia following failed intubation, while the fifth death followed an unsuccessful cardiopulmonary resuscitation in an eclamptic patient, or due to eclampsia.

From this study, mortality was recorded in the general anaesthesia group. Spinal anaesthesia, when there is no contra- indication is therefore recommended for safe obstetric anaesthesia. Brisk pre-operative evaluation, optimization of pre-operative clinical status of parturients and competent anaesthetist are of paramount importance.

***Key Words**: Obstetric anaesthesia; emergency caesarean section; morbidity and mortality.*

## Introduction

In emergency situation, there is restricted time for assessment and optimization of the partrurients' clinical condition before anaesthesia and surgery. Obstetric anaesthesia is reported to be the third most common cause of maternal mortality (Geraldine, 1990). The causes of anaesthesia related deaths include; equipment failure, drug error, difficult/failed intubation and aspiration of gastric contents (Turnbull, et al 1986).

In Caucasians, aspiration pneumonitis (Mendelson's Syndrome) is the common cause of anaesthetic related mortality (Mendelson, 1946 and Turnbull, et al 1986). This is not the case with Nigerians. Waboso, (1973) in his study on maternal mortality in Nigeria, did not report any case due to gastric acid aspiration. Bassey, (1977) in his study on pregnancy and heart burn in Nigerians and Caucasians, explained a racial difference. He stated that the lower oesophageal sphincter (LOS) is intrathoracic in the Caucasians and with the upward displacement of LOS during pregnancy, the risk of gastro-oesphageal reflux is increased more in the Caucasians. Ijaiya and Aboyeji (2001) in their study showed that 13.1% (4/29) mortality was attributed to anaesthesia following Caesarean section. Famewo, (1982) as well as Cooper, et al (1984) had reported that 60% of anaesthetic related deaths were due to human error. The Reports on confidential enquiries into Maternal Deaths in England and Wales for the years 1979 to 1981 revealed that 14% of anaesthetic related deaths were due to anoxia and 10% were due to aspiration of gastric contents (Turnbull, et al 1986). We are not aware of any study on the outcome of obstetric anaesthesia in emergency Caesarean section in our community. The aim was, therefore, to evaluate morbidity and mortality following obstetric anaesthesia for emergency Caesarean sections and relate the findings to the techniques used as well as the cadre of the attending anaesthetist. The outcome shall allow the recommendation of standards for the practice of safe obstetric anaesthesia.

## Materials and Methods

This study was in respect of 920 parturients that presented for emergency Caesarean section from 1st August 1995 – 31st August 2000 The assessment was within 24 hours postoperatively. Information was obtained from anaesthetic record charts, threatre and ward records. The patient's age, indication for surgery and the anaesthetic techniques adopted were noted. The American Society of Anaesthesiologist (ASA) classification for fitness was noted for each patient:

Class 1. A healthy patient.

Class 2. A patient with mild systemic disease.

Class 3 A patient with severe systemic disease that limits activity but is not incapacitating.
Class 4 A patient with an incapacitating systemic disease that is a constant threat to life.
Class 5 A moribund patient not expected to survive 24 hours with or without operation.
Morbidity, (including life threatening events) and mortality were also noted. Anaesthetic related deaths were taken as that which followed critical incidence within 24 hours of administration of anaesthesia. Critical incident is considered as an event which would cause mobidity or mortality if not recognized and treated promptly. Direct maternal death (e.g. post partum haemorrhage) and those beyond 24 hours were excluded. Patients relatives generally did not accede to post mortem examination. Thus the causes of deaths were based on clinical diagnosis in all the cases.
The data so obtained were evaluated using simple proportion, rates and tables.

**Results**

A total of 1.533 Caesarean sections were recorded over a period of five years. Out of these, 920 were emergencies, giving an emergency Caesarean section rate of 60.0%. Their age range was 13 – 46 (mean = 29.5) years. Majority of the parturients were between 33 – 37 years (n=275). The weight ranged between 40-96kg (mean=78.4). The indications for the emergency Caesarean sections were mainly obstructed labour 217 (23.6%), foetal distress 183 (19.9%) and severe pre-eclampsia/eclampsia 142 (15.4%). The technique of anaesthesia was either general or spinal anaesthesia. The choice of anaesthetic technique was dependent on the pre-operative condition of the patient. In the general anaesthesia group, the majority, 276 (49.7) were categorized as ASA II. ASA III were 120 (21.o%) and ASA IV were 33 (5.9%). General anaesthesia was achieved using inhalation technique and intermittent positive pressure ventilation (IPPV).
Thiopentone was used for induction of anaesthesia in 494 (89%) patients while 61 (11%) patients received Ketamine. All the patients received suxamethonium to facilitate endotracheal intubation. All the patients received nitrous oxide in oxygen and 0.5% halothane. Pancuronium was used to achieve muscle relaxation in 332 (59.8%) patients. Atracurium was also used to achieve muscle relaxation in 223 (40.2%) patients.

In the spinal anaesthesia group, the majority 199 (54.5%) were classified as ASA II. ASA I were 151 (41.3%). ASA III were 14 (3.8%) while ASA IV was one (0.27). Spinal anaesthesia was procured using 0.5% hyperbaric bupivacaine in 224 (61.4%) patients while 5.% hyperbaric lignocaine was used in 141 (38.6%) patients. Spinal needle size was 22G in the early part of the study but later 25 – 26G was used.

Morbidity recorded in the general anaesthesia group was mainly sore throat 364 (65.6%). Morbidity in the spinal anaesthesia group were; hypotension (systolic blood pressure less than 90 mmHg or 20% reduction in baseline level) was recorded for 110 (30.1%). Post dural puncture headache (PDPH) in 46 (12.6%) and Transient neurological symptoms (TNSs) in one (0.22%). No mortality was recorded in the spinal anaesthesia group. Five (0.9%) deaths occurred in the general anaesthesia group. Four deaths occurred within 35 – 40 minutes into the operation time following failed intubation. Three of these parturients were classified as ASA III while the fourth was in ASA II. The fifth death occurred in the post-natal ward two hours post-operatively, sequel to cardiac arrest in a teenage eclamptic patient (ASA IV)

*Table 1: Age Distribution*

| S/NO. | AGE (YEARS) | NO. | % OF TOTAL |
|---|---|---|---|
| 1. | 13 - 17 | 27 | 2.9 |
| 2. | 18 - 22 | 35 | 23.8 |
| 3. | 23 - 27 | 24 | 2.6 |
| 4. | 28 - 32 | 58 | 6.3 |
| 5. | 33 - 37 | 275 | 30.0 |
| 6. | 38 - 42 | 269 | 29.2 |
| 7. | 43 - 46 | 32 | 4.7 |
| | Total | 920 | 100 |

## Discussion

This study revealed that 920 parturients presented as emergency for Caesarean sections. In an emergency situation, there is limited time to optimize the patients' clinical condition before surgery.
The commonest indication for emergency Caesarean section was as a result of obstructed labour following cephalo-pelvic disproportion. This is similar to the experience of other workers in the developing countries (Wright, et al 1988). This has been attributed to the fact that mothers who themselves were malnourished during adolescent and puberty with consequent poor skeletal development, leading to contracted pelvis. These patients now live in relatively more affluent era with better nutrition, giving rise to big babies. This would lead to cephalopelvic disproportion which otherwise would not exist (Okonofua, et al 1992).
The age distribution in this study shows that the majority of the parturients were in the age group

between 37 – 42 years. It has been reported that most parturients in this age group have high parity most of them also have prolong labour under the care of untrained personnels who reluctantly release case of obstetric complications to conventional health centres (Udoma et al 1999).

The choice of anaesthetic technique was dependent on anaesthetists' technical proficiency and the parturients' fitness. About the same number of patients with obstructed labour had general anaesthesia 112 (12.2%) and 108 (11.7%) had spinal anaesthesia. More parturients with foetal distress had general anaesthesia probably because urgent intervention was required.

*Table 2: Indication for Caesarean sections and Anaesthetic techniques*

| S/no. | Indication for Caesarean Section | GA n=555(%) | SA n=365(%) | Total n=920(%) |
|---|---|---|---|---|
| 1. | Obstructed Labour | 112(20.1) | 108(29.6) | 220(23.9) |
| 2. | Foetal Distress | 133922.0) | 61916.7) | 183(19.9) |
| 3. | Pre-eclampsia/Eclampsia | 77(13.9) | 65(17.8) | 142(15.4) |
| 4. | Antepartum Haemorrhage | 61(11.0) | 15(4.19) | 76(8.3) |
| 5. | Prolonged Labour | 39(7.0) | 28(7.7) | 67(7.3) |
| 6. | Previous C/S (>2) in Labour | 46(8.3) | 21(5.8) | 67(7.3) |
| 7. | Failed Induction of labour | 35(6.3) | 29(7.6) | 64(7.0) |
| 8. | Footling Breech | 20(3.6) | - | 20(2.2) |
| 9. | Cord Prolapse | 12(2.2) | 5(1.4) | 17(2.0) |
| 10. | Transverse/Oblique Lie | 18(3.2) | 5(1.4) | 15(2.0) |
| 11. | Previous Myomectomy | 9(1.6) | - | 9(1.0) |
| 12. | Multiple Pregnancies | - | 8(2.2) | 8(0.9) |
| 13. | Breech Presentaiton | - | 8(2.2) | 8(0.9) |
| 14. | Premature Rupture of Membrane | 4(0.7) | 3(0.8) | 7(0.8) |
| 15. | Retained Second Twin | - | 6(1.6) | 6(0.7) |
| 16. | Sickle cell crisis at term | - | 1(0.3) | 1(0.1) |
| | Total | 555 | 365 | 100 |

*Table 3a: Cadre of anaesthetist/asa classification and outcome (general anaesthesia group)*

| | | ASA CLASSIFICATION | | | | | OUTCOME | |
|---|---|---|---|---|---|---|---|---|
| S/no. | Cadre of Anaesthetist | I (n-126) | II(n=276 | III(n=12) | IV(n=33) | Total | Morbidity | Mortality |
| 1. | Consultant | 15 | 36 | 18 | 7 | 76 | 34 | - |
| 2. | Senior Resident | 42 | 66 | 30 | 15 | 153 | 57 | - |
| 3. | Junior Resident | 69 | 174 | 72 | 11 | 326 | 273 | 5 |
| | TOTAL | 126 | 276 | 120 | 33 | 555 | 364 | 5 |

*Table 3b: Cadre of anaesthetist/asa classification and outcome (spinal anaesthesia group)*

| | | ASA CLASSIFICATION | | | | | OUTCOME | |
|---|---|---|---|---|---|---|---|---|
| S/no. | Cadre of Anaesthetist | I (n-151) | II(n=199) | III(n=14) | IV(n=1) | Total | Morbidity | Mortality |
| 1. | Consultant | 33 | 10 | _ | _ | 43 | 14 | - |
| 2. | Senior Resident | 101 | 181 | | - | 290 | 115 | - |
| 3. | Junior Resident | 17 | 8 | 6 | 1 | 32 | 28 | - |
| | TOTAL | 151 | 199 | 14 | 1 | 365 | 157 | - |

In this study and others, maternal mortality associated with general anaesthesia occurred when Caesarean sections were performed as emergency (Turnbull, 1986). This is because of restricted time to optimize parturients clinical condition before surgery (Geraldine, 1990). Failed endotracheal intubation was the main critical incidence that preceded death in four (0.8%) parturients. The report on confidential enquires into maternal death revealed that 14% of anaesthetic related maternal deaths were due to anoxia following difficult/failed intubation (Turnbull, et al 1986). Difficult airway management is one of the principal risks encountered during general anaesthesia for Caesarean section. Gibb's (1986) had estimated

that difficult intubation is encountered in five percent of obstetric anaesthesia.

Brisk pre-operative assessment of the parturient's airway is of paramount importance to predict difficult airway and, therefore, plan the management strategy, in order to avoid airway catastrophe and subsequent mortality (Ita, et al 1994 and Rocke, et al 1992). The 16 year old mother who had obstructed labour and eclampsia suffered cardiac arrests, two hours postoperatively which was unamenable to cardiopulmonary resuscitation. There is no post-anaeshetic care unit in the obstetric theatre. Patients are returned to the post-natal ward immediately after surgery. Monitors such as pulse oximeters, electrocardiogram, automated blood pressure monitors are not available in the postnatal ward. Most of the time there is one and at most two nurses per shift to take care of mothers in the postnatal ward. It is therefore necessary to make provision for post anaesthetic care unit in the obstetric threatre as well as providing enough man power and monitors in the post-natal ward.

The pattern of ASA categorization showed that in the general anaethesia group there were more patients in ASA III and IV. This would probably proffer the reason for mortality in this group. Besides these patients needed urgent intervention after presenting late in advanced but complicated labour. There was no mortality in the spinal anaesthesi group. This is probably because patients in this group were mainly in ASA I and II and this may have resulted in the better outcome. Besides spinal anaesthesia was performed mostly by senior resident anaesthetists.

Recently, spinal anaesthesia has been recommended for obstetric patients (Geraldine, 1990). With spinal anaethesia, the patient is conscious and can participate in her management. There is no airway manipulation and no fear of airway catastrophe.

With regards to the cadre of the attending anaesthetist, no mortality was recorded for the consultants and the senior residents while five deaths (0.4%) were recorded for the junior residents. This underscores the need for the supervision of junior trainee anaesthetists posted to obstetric threatre. The junior residents should also be conversant with failed intubation drill and the need for prompt invitation of a more competent colleague when the need arises.

Morbidity in the general anaesthesia group was mainly sore throat. This may have been probably due to a period of panic when trying to secure a patent airway before an urgent intervention. Secondly the use of relatively large endotracheal tube (>7mm size) in obstetric patient should be discouraged. In the obstetric patient, there is mucosal and vascular congestion with an increased risk of trauma and difficulty at intubation. (Waddington, et al 1989). Therefore, the use of smaller tubes, size 6.0mm is

Morbidity recorded in the spinal anaesthesisa group included severe hypotension in 110 (30.1%) parturients. Hypotension is a common complication following spinal anaesthesia. It is particularly life threatening in hypovolaemic patients. Hence pre-loading the patients with crystalloid infusion is necessary (Geraldine, et al 1990).

Post-spinal headache or Post dural puncture headache (PDPH) occurred in 46 (12.6%) of the mothers. This is comparable with a rate of 5 – 10% that had been reported by other workers. (Waddington, et al 1989 and Geraldine, et al 1990). Our figure may have been influenced by the large size of spinal needles 20-22 G used previously. In recent times, however, size 25 – 26 G needles were used and PDPH was seen in four (1.0%) mothers. The needles had cutting tip, this therefore affirms that the nature of the tip and not the size that is responsible for PDPH. (Geraldine, 1990). The pencil point needles such as Sprotte and Whitacre are known to reduce the incidence of PDPH. (Dixon, 1991). However, when a cutting tip needle is used, the bevel should be placed in the vertical plane to avoid making a hole in the dura. (Geraldine, 1990).

Transient neurologic symptoms (TNSs) previously known as radicular irritation occurred in one (0.2%) mother. This is however, less than what had earlier been reported by other workers. This is probably because we noted only the reports documented for 24 hours post-operatively. Hampl et al (1996) had reported the incident rate of TNSs to be 3.1% following spinal anaesthessia with 2% and 5% hyperbaric lidocaine. Pollock, et al (1996) also observed unilateral TNS s after 0.5% or 0.25% hyperbaric bupivacaine. . Rorarious et al (2001) reported an incidence of TNSs of 2.8% following spinal anaesthesia with 0.5% hyperbaric bupivacaine. In our study, TNSs occurred after the use of 0.5% hyperbaric bupivacaine. The mechanism of TNSs is thought to be due to maldistribution and pooling of local anaesthetic and its neurotoxic effects. Severe hypotension is known to reduce spinal cord blood flow, which in turn increases the sensitivity of spinal cord structures to neurotoxic agents.

In conclusion, this study has shown that obstetric anaesthesia for emergency Caesarean section had a fair outcome. We recommend spinal

anaesthesia for emergency Caesarean section if no contraindication exist.

Brisk pre-operative evaluation and optimization of the parturients clinical condition are of paramount importance in the practice of safe obstetric anaesthesia. A team approach to the care of parturients among anaesthetists, obstetricians and nurses would improve the outcome.

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