

The case for an obstetric anaesthetic service — An obstetrician's view-point

by

T. A. Sinnathuray, MB, FRCS (G & E), MRCOG.

KANDANG KERBAU HOSPITAL, SINGAPORE.

Introduction

Despite the manifold recent advances in the various facets of obstetrics and anaesthesia in the last decade, the hazards of anaesthesia in obstetric practice still remain a major problem. Both the mother and the baby can be the victims of the hazards of the varied types of anaesthesia that are utilised in obstetric practice.

The Problem

A review of the "Reports on Confidential Enquiries into Maternal Deaths in England and Wales" (Walker et al) reveals that general anaesthesia, as used in operative obstetrics, is still an important contributor to preventable maternal morbidity and mortality. Over the nine-year period, 1952-60 inclusive there were

4,073 maternal deaths in England and Wales. In the same nine-year period, 110 maternal deaths were the result of complications of anaesthesia—a gross incidence of 2.7% of all the maternal deaths.

During the first 3 years of this Maternal Mortality Survey, no attempt had been made to subdivide the maternal deaths into the avoidable and unavoidable groups. However, for the subsequent 6-year period of 1955 to 1960 inclusive, it is apparent that out of the 61 maternal deaths from anaesthesia, 48 deaths (78.7%) fell into the group categorised as "avoidable maternal deaths". That is, theoretically at least, more than three-quarters of all maternal deaths attributed to anaesthesia were preventable. A breakdown of these 110 maternal deaths revealed that 40.9% (45 deaths) were the result of inhalation of vomited or regurgitated

TABLE I

Deaths due to complications of anaesthesia in England and Wales—1952-1960

| Year | 1952 | 1953 | 1954 | 1955 | 1956 | 1957 | 1958 | 1959 | 1960 | 1952 to 1960 |
|---------------------|------|------|------|------|------|------|------|------|------|--------------|
| Avoidable: | — | — | — | 11 | 8 | 5 | 12 | 7 | 5 | — |
| Unavoidable: | — | — | — | 1 | 3 | 3 | 1 | 2 | 3 | — |
| Total: | 15 | 15 | 19 | 12 | 11 | 8 | 13 | 9 | 8 | 110 |

% of Maternal Deaths due to anaesthesia = 2.7%

stomach contents under general anaesthesia during the conduction of forceps delivery. In the United Kingdom, therefore, mal-administered anaesthesia during forceps delivery is the single major cause of anaesthetic maternal mortality. This is certainly no new problem, as the dangers of general anaesthesia in operative obstetrics, in particular, forceps delivery, have been repeatedly emphasized by many authorities in the last few decades (Eastman, 1941; Jeffcoate, 1953; Parker, 1954, 1956; and Walker et al, 1957, 1960, 1963).

It is much regretted that similar comprehensive statistical data, as outlined for England and Wales, are, at present, unavailable for Malaysia, or even for the State of Singapore. Hence, the evaluation of the adequacy and efficacy of our anaesthetic services is made difficult.

Criteria of an Ideal Obstetric Anaesthesia

As viewed from the obstetrician's angle, Tomkinson (1957) has stated that an ideal obstetric anaesthesia should fulfil the following requirements:

(i) Absolute safety for both mother and child:

This is the first and most important requirement. To achieve this one must consider firstly the dangers of a full stomach to the mother, and the steps which may be taken to minimize these dangers, and secondly the hazards of maternal hypoxia to the child.

Tomkinson (1957) stated that the mother should be instructed regarding diet following the onset of labour. Heavy meals must be avoided. An emetic dose of apomorphine may be considered as a means of emptying the stomach. A tilting bed at the instantaneous control of the anaesthetist has also proved its value.

He stated that from the foetal angle, the oxygen supply may become inadequate for many reasons, including placental insufficiency syndrome, prolapse of the umbilical cord, prolonged uterine contractions, or defects on the part of the mother in providing an adequate level of oxygen. He stated that any additional hazard causing further anoxia, such as readily occurs during the induction of general anaes-

thesia, may tip the balance against the baby's survival.

Walker and Turnbull (1953) have shown that when the oxygen saturation of foetal haemoglobin in the umbilical vein falls below 30% there will be evidence of foetal distress including the passing of meconium, and irregularity or slowing of the foetal heart. Walker suggests that the anaesthetic for the delivery of the anoxic foetus should be spinal, caudal or pudendal anaesthesia (Tomkinson, 1957), since during the induction period of most general anaesthetics there are occasions when the maternal oxygen uptake may be impaired.

In this context of safety of the anaesthesia to both mother and baby, I would like to stress the many-fold advantages of "pudendal block anaesthesia": This regional anaesthetic procedure is suitable for almost all instances of assisted vaginal deliveries, be it forceps delivery, vacuum extraction or breech delivery. It is now widely used by obstetricians all over the world. It is almost completely safe for the mother, and completely safe for the baby. It has few complications for the mother, and none for the baby. It is easy to learn and one can quickly become efficient at the technique. The obstetrician is independent of the skilled anaesthetist. The mother is awake and able to co-operate. The uterus contracts well and atonic postpartum haemorrhage is less likely to occur. A pudendal block anaesthesia can be effected within a far shorter time-interval than would be required to summon an anaesthetist and administer a general or spinal anaesthesia. The equipment is easily carried, and the procedure can be used with safety and convenience not only in Hospital practice but also in Maternity Homes and Domiciliary practice.

(ii) The Duration of Pain Relief:

The length of time for which pain relief is required is an important consideration (Tomkinson, 1957). A general anaesthesia can be safely administered for that duration of time which is required for any type of abdominal or vaginal operative procedures. Similarly the duration of effect of a spinal or pudendal block anaesthesia is more than adequate for the usual abdominal or vaginal delivery procedures. However, it is stated that no general methods

of anaesthesia could provide such a long period of pain relief in labour, with equal safety to the mother and baby, as continuous epidural techniques (Tomkinson, 1957).

(iii) The Position of the Patient for Delivery:

Tomkinson (1957) states that the anaesthetised patient is best placed in the lithotomy position to satisfy the demands of the obstetrician for ease of access to the patient, accurate anatomical diagnosis of the position of the baby relative to the maternal pelvis, and for maintenance of asepsis. He furthermore states that the foetal heart can be easily checked, and the patient is in the correct position for the management of the third stage of labour, and for the suturing of an episiotomy. However, from anaesthetist's viewpoint, the patient is probably best kept in the lateral position, so that any vomitus is readily expelled out and silent aspiration of regurgitated gastric contents avoided.

(iv) Adequacy of Anaesthetic Personnel:

The ready availability of trained anaesthetic personnel is essential if the criteria for an ideal obstetric anaesthesia is to be fulfilled. As many obstetric emergencies are of insidious nature, with possible death to foetus and in some instances the mother from delay in delivery, the availability of an anaesthetist without delay becomes imperative.

In this era of medical practice, specialisation is the rule rather than the exception, especially so in hospital practice. Further, the last few decades have seen the growing tendency to specialise within a speciality, thus we have specialists in the various subdivisions of general medicine and general surgery. In this context, the field of anaesthesia is no exception, and the speciality of "Obstetric Anaesthesia" has come to be a reality to both anaesthetists and obstetricians. There are many centres in the United States of America, and a few centres in the United Kingdom that have anaesthetists engaged in full-time clinical practice and research in the field of obstetric anaesthesia.

Crawford (1959) has stated that the general aims, by the satisfaction of which any method of anaesthesia for operative obstetrics is to be

judged, should fulfil the following criteria as detailed in TABLE II (below):

TABLE II

**Criteria of Adequate Obstetric Anaesthesia
(After Crawford, J. S. (1959)).**

| |
|---|
| <p>(a) Concerning the Mother:</p> <ol style="list-style-type: none"> 1. To provide a sure relief from pain. 2. To provide continuous adequate oxygenation. 3. To involve the minimal use of toxic drugs. 4. To avoid the production of hypotension and vomiting, and if these should appear likely to occur, to provide prophylaxis against their ill-effects. 5. To provide maximum physical and psychological comfort within the terms of the preceding and following conditions. <p>(b) Concerning the Child:</p> <ol style="list-style-type: none"> 1. To guard against any diminution of oxygen supply. 2. To ensure the minimal degrees of central depression due to anaesthetic agents. |
|---|

The above table is self-explanatory. Crawford (1959) states that it is only with such an approach in mind, with its object of ensuring the greatest safety for mother and child, can any discussion on obstetric anaesthesia and its indications be satisfactorily undertaken.

Obstetrical Indications for Anaesthesia:

Caesarean Section/Caesarean Hysterectomy:

Anaesthesia for this operation is entirely within the province of the specialist anaesthetist. Besides providing a satisfactory working condition for the obstetrician, the anaesthetist is constantly conscious of any toxic effects to the mother and unborn child from the anaesthetic agents utilised. The type of anaesthesia used is entirely the prerogative of the anaesthetist. The anaesthetist is also responsible for the resuscitation of the neonate, in the absence of an attendant paediatrician.

TABLE III

Obstetrical Indications for Anaesthesia

| Maternal-Foetal Interests: | Maternal Interests: |
|--|---|
| 1. Caesarean Section/Caesarean Hysterectomy. | 1. Hysterectomy. |
| 2. Forceps Delivery. | 2. Hysterotomy. |
| 3. Breech Delivery. | 3. Manual Removal of Placenta. |
| 4. Internal Version/Extraction. | 4. Exploration of Uterine Cavity. |
| 5. External Cephalic Version. | 5. Destructive Operations. |
| 6. Manual Rotation of Head. | 6. Sterilisation by Tubal Ligation. |
| 7. Twin Delivery. | 7. Acute Surgico-Gynaecological Emergencies in Pregnancy. |
| 8. Disordered Uterine Action. | 8. Flying Squad Service. |

Forceps Delivery:

With complete disappearance of the "high" and "floating" forceps delivery from modern obstetric practice, the indications for general anaesthesia in this obstetric procedure is becoming less frequent. With accuracy in the technique of "pudendal block anaesthesia" and dexterity in the use of Kielland's Forceps for rotation and delivery of the foetal head in the deep transverse arrest or persistent occipitoposterior positions, a very high proportion of all forceps deliveries can be undertaken by the obstetrician single-handed. The few indications for general anaesthesia in forceps delivery are probably cases of eclampsia, and those very apprehensive patients, where the conduction of forceps delivery under pudendal block becomes impossible. The place for pudendal block in forceps delivery is strongly fortified, when it is realised that general anaesthesia in forceps delivery contributed to just over 40% of the 110 maternal anaesthetic deaths in England and Wales for the period of 1952-1960 inclusive, (Walker et al).

Breech Delivery:

Just as in forceps deliveries, the majority of breech deliveries may not have required the attendance of an anaesthetist. However, as it is

impossible to anticipate difficulty in the delivery of the shoulder or the aftercoming head, and as general anaesthesia would be helpful in such instances, it is advisable for an anaesthetist to be in attendance at breech deliveries. Here, again, the anaesthetist may play a part in the resuscitation of the asphyxiated infant. Crawford (1959) has appropriately stated the place of an anaesthetist in breech delivery in the following words: "If the operation is successful-an anaesthetist will not have been required, However, such success can never be guaranteed, and in many hospitals an anaesthetist is requested to attend all breech deliveries. The fact that in most instances he apparently plays only a passive part should occasion absolutely no resentment. He can with advantage take over the management of the analgesic technique."

Internal Version/Extraction:

In modern obstetric practice the only indication for this obstetric procedure is in the management of the second twin. General anaesthesia with adequate relaxation of the uterine and abdominal muscles is an essential prerequisite for success, and hence it falls in the realm of specialist anaesthetist.

External Cephalic Version:

General anaesthesia may be required for this obstetric procedure, where there is an indication and where the version without anaesthesia has failed. This is usually an elective procedure, and the anaesthesia should be the responsibility of the specialist-anaesthetist.

Manual Rotation of the Head:

For a successful outcome, this procedure will require general anaesthesia, as it is not only necessary to be able to insert the whole hand into the vaginal canal but also the need to relax the abdominal muscles to effect simultaneous rotation of the shoulders with the head. However, dexterity in the use of Kielland's forceps under pudendal block anaesthesia may serve as an alternative.

Twin Delivery:

The need for a trained anaesthetist to be in attendance at a twin delivery is obviated in view of the high incidence of assisted delivery in the second twin. In particular, general anaesthesia will be required, if internal podalic version and breech extraction is performed.

Disordered Uterine Action:

The role of the anaesthetist in the management of this condition is the administration of a continuous epidural anaesthesia, which can be beneficial.

Hysterectomy:

Uncontrollable postpartum haemorrhage and rupture of the uterus are the two common indications for an obstetric hysterectomy. This operation requires a general anaesthesia, and falls within the realm of the specialist anaesthetist.

Hysterotomy:

With the advance of medical science, the medical and obstetrical indications for hysterotomy are on the decline, whereas in many western countries, the psychiatric and sociological indications are steadily on the climb. The anaesthesia, be it general or spinal, is the sphere of a trained anaesthetist.

Manual Removal of Placenta:

General anaesthesia is called for in the management of retained placenta associated with prolonged adherence to the placental site, and where manual removal has to be undertaken. Such cases are sometimes exsanguinated and shocked, and hence best handled by the trained anaesthetist.

Exploration of the Uterine Cavity:

This procedure may be indicated in cases of suspected rupture of the uterus, cervical tears or retained fragments of placenta, and is best carried out under general anaesthesia. Such cases are often shocked or exsanguinated, and hence best handled by the trained anaesthetist.

Destructive Operations:

With improved standards of obstetrical practice, the indications for destructive operations, be it craniotomy, decapitation or embryotomy, should be few indeed. Such operations are ideally performed under general anaesthesia so to allow for maximum working comfort to obstetrician, and safety to the patient. The role of the anaesthetist in such operations is not only to alleviate maternal pain but also to produce adequate relaxation of both abdominal and uterine muscles.

Sterilisation by Tubal Ligation:

This operation involves a laparotomy, and is best done under general anaesthesia for maximum comfort to both patient and obstetrician.

Acute Surgico-Gynaecological Emergencies in Pregnancy:

Acute Surgico-Gynaecological emergencies in the pregnant patient are not a common occurrence, especially those requiring operative intervention. Acute appendicitis and torsion of the ovarian cyst pedicle are the commonest types of surgico-gynaecological emergencies in the pregnant patient. In both instances, an immediate laparotomy and removal of the diseased organ is indicated, and the anaesthesia, be it general or spinal, is the province of the trained anaesthetist.

Flying Squad Service:

A "Flying Squad Service" is an obstetrical team, composed of an obstetrician, an obstetrical house-officer, an anaesthetist and sometimes a nurse. The obstetrician and anaesthetist are experienced personnel of either Consultant, Senior Registrar or Registrar grading. The "Flying Squad Service" has come to be an essential component of all the regional obstetrical services in the United Kingdom. It is regrettable that this Service is at present non-existent in Malaysia. This obstetrical team is stationed at the Maternity Hospitals in the towns, and can be summoned to the bedside

of the ill obstetrical patient, be it in a peripheral "Maternity Home" or in Domiciliary practice. The "Flying Squad Service" can be live-saving in such situations where urgent therapy by the bedside is indicated, and where the transfer of the untreated ill patient to the Hospital may be the "last straw" to death. The common types of problem that such a Service is called to handle are usually the resuscitation of a shocked and exsanguinated patient, manual removal of the placenta, and emergency therapy of an eclamptic patient. In all such instances, the presence of an anaesthetist is of invaluable help to the patient and obstetrician.

Maternal Mortality Trends in Anaesthesia

TABLE IV

Comparative Anaesthetic Maternal Mortality Trends in Kandang Kerbau Hospital and in England and Wales

| | K.K. Hospital | England & Wales |
|--|--------------------------|---------------------------|
| Period under Review | 1955-1962 (8 years) | 1952-1960 (9 years) |
| Total number of Deliveries - - | 255,926 | 6,550,900 |
| Total number of Maternal Deaths - - | 208 | 4,073 |
| Gross Maternal Mortality Rate - - | 0.81/1,000 | 0.62/1,000 |
| Number of Anaesthetic Maternal Deaths Maternal Mortality Rate from Anaesthesia - - | 13 0.051/1,000 | 110 0.017/1,000 |
| % of Maternal Deaths due to Anaesthesia - - | 6.3% | 2.7% |

The comparative Maternal Mortality trends from anaesthesia for the Kandang Kerbau Hospital (Lean, T. H., 1964) and for England and Wales (Walker, A. L. et al, 1957, 1960, 1963) have been summarised in TABLE IV. It is apparent that the statistical data from both these places are of comparative series, as both the periods under review (1952 to 1960) and the

duration of years reviewed (8 to 9 years) are similar. Although the gross Maternal Mortality rate for the Kandang Kerbau Hospital (0.81/1,000) is only about 30% more than that for England and Wales (0.62/1,000), the Maternal Mortality rate from anaesthesia at this Hospital (0.051/1,000) is three times as high as that for England and Wales (0.017/1,000).

It is further apparent that anaesthetic hazards are responsible for 6.3% of all maternal deaths at this Hospital, as compared to only 2.7% of all maternal deaths in England and Wales; that is anaesthetic hazards are more than twice as frequent a cause of maternal mortality in this Hospital as compared to the whole of England and Wales.

It must be pointed out that although direct reference has only been made to the maternal mortality trends in relation to anaesthesia, there exists the far greater problem of maternal morbidity, and both foetal mortality and morbidity, that can arise from mal-administered anaesthesia.

The comparatively higher rate of anaesthetic maternal mortality in this Hospital as compared to that prevailing in England and Wales is probably of multifactorial origin. Socio-economy is an important factor. The majority of obstetric patients in this Hospital hail from the lower Socio-economic strata, and reach the operation-table in a poorly nourished state, and often with subclinical anaemia, as compared to their western sisters in the Welfare State of United Kingdom. A great majority of patients are admitted to the labour wards of this Hospital as an emergency, and hence inadequately prepared from the anaesthetist's viewpoint.

Obstetric anaesthesia is a specialised branch of anaesthesia, and it constantly involves two lives—the mother and the unborn child. There is little doubt that all such anaesthesia is best handled by the trained anaesthetist. There is a chronic shortage of medical personnel in the Singapore Medical Service, and the Anaesthetic Department is probably not free from this. As a result of this shortage of anaesthetic personnel, it has become a routine in this Hospital for the junior obstetric personnel, untrained in anaesthesia, to administer general anaesthesia for intra-uterine manipulative procedure, such as manual removal of placenta, exploration of uterine cavity, internal podalic versions, and the occasional forceps and breech deliveries. This is probably another major cause of comparatively higher anaesthetic maternal mortality in this Hospital.

The picture in an obstetric patient is constantly changing, and the need for operative

interference may be sudden in onset and urgent, e.g. severe foetal distress, prolapse of the umbilical cord, rupture of the uterus, or severe haemorrhage from placenta praevia. The immediate availability of an anaesthetist under these circumstances is of vital importance, if both maternal and foetal mortality and morbidity is to be kept to the minimum.

Conclusion

In the light of the discussion that has prevailed, and in view of the large volume of abnormal obstetric work that can arise in a centre which deals with about 40,000 deliveries per annum, there is a good case for a Resident Obstetric Anaesthetist in this Hospital.

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