Appropriate Technology

Obstetric care

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Obstetric care in Third World hospitals differs from that in Britain in several important respects. Skill, drugs, equipment, and finance may be limited, and the large number of patients cared for may make overcrowding a serious problem. Although the emphasis of medical care must be on prevention, complications from neglect, such as obstructed labour and ruptured uterus, are common. In addition, it is important to respect the local cultural practices and customs, and this may lead to modifications in management.

Some obstetric complications—for example, eclampsia, disproportion, and severe anaemias—are more common in certain geographical areas than in others. Thus priorities in care must focus on the local problems of the community. Certain equipment, such as a sphygmomanometer and a fetal stethoscope, is essential wherever one is practising, but other equipment and, more especially, drugs may be necessary in some areas and not in others. In addition, modifications may have to be made to fit in with the availability of drugs in different countries.

FIG 1—Graph of symphysis-fundal height, showing normal ranges of uterine height, in centimetres, by week of gestation.

The antenatal clinic

A suitable antenatal card, emphasising the detection of risk factors, is essential. Several have been designed for use in the Third World by non-medical staff,^{1 2} and these may be adapted for use in hospitals.^{1 2} Mothers should keep their own antenatal cards, for experience in many countries has shown that they do so safely, and it saves a great deal of time at busy clinics. In areas

where intrauterine growth retardation is common a graph of symphysis-fundal height should be included in the records (fig 1). This is useful in detecting small for dates babies.^{3 4}

Maternal height is an important risk factor in the Third World.⁵ If a conventional measure is not available it is easy to mark a wall of the clinic. Another method is to put a bar across the door into the antenatal clinic at the local "at risk" height (fig 2). Those women who do not have to stoop to enter the room may thus be readily identified and registered as at risk. It is a waste of time to weigh women at each visit, but every woman should be weighed at her first visit and those of very low weight (below about 40 kg) should be given nutritional advice and possibly food supplements.

Facilities for testing urine for protein should be available in all areas, but screening for glycosuria is not necessary if the prevalence of diabetes in the local population is very low. The speed and simplicity of stick tests such as Albustix and Clinistix will usually outweigh their disadvantage in cost over older methods.

The blood tests that should be performed routinely in the clinic will be influenced by the locality (for example screening

FIG 2—Bar across the door of the antenatal clinic placed at the local "at risk" height.

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for sickle cell disease where the population is negro), by the prevalence of diseases (serological tests for syphilis would be a high priority in Lusaka⁶ but are unnecessary if syphilis is rare), and, of course, by the laboratory facilities available. The only absolutely essential blood test in all communities is the haemoglobin concentration.

Essential medication includes iron, folic acid, a simple analgesic such as soluble aspirin, and a laxative such as Senokot. Tetanus toxoid is advisable in most countries of the Third World.⁷ A minimum of two doses should be given, the first as early in pregnancy as possible and at least two months before delivery. A booster dose should be given in subsequent pregnancies. Malarial prophylaxis is important where malaria is endemic.

The antenatal ward

This requires similar equipment to the clinic, with the following additions:

(1) Charts. A chart for recording observations on blood pressure, urine output and test results for proteinuria.

(2) Drugs. A local assessment should be made of the availability and cost of useful drugs. If no up to date local pharmacopoeia exists it is essential to develop your own and to work out the most cost effective treatment for a particular condition. The common obstetric problems needing drug treatment are severe

FIG 3—Partogram. The normal rate of cervical dilatation is about 1 cm/hour (the slope of the alert and action lines) The examples shown are for women found to be 4 cm dilated on admission in labour.

anaemias (sometimes with heart failure), hypertension, eclampsia, and infections. Thus a potent diuretic, quick and slow acting hypotensive agents, oral and injectable sedatives, and appropriate antibiotics must be available.

(3) Fetal monitors. The methods currently used for fetal monitoring in the United Kingdom (ultrasound measurements, tracings of fetal heart rate, and serum or urinary oestriol concentrations) are rarely practicable in Third World hospitals. Reliance should be placed on the clinical assessment of fetal growth, measurements of fundal height, and changes in maternal weight. Kick charts are suitable for literate women, in both the antenatal clinic and the ward.⁸ The mother should be advised to count her baby's movements, starting at sunrise each day and stopping when she gets to ten. If she has not noticed ten movements by sunset on two successive days she should notify the midwife or doctor. A hand ultrasound fetal heart detector is useful.

Additional facilities

Referral and teaching hospitals should consider amnioscopy, which enables the forewaters to be visualised through the cervix.⁹

Assessment of volume and colour of the amniotic fluid gives an indication of fetal wellbeing. Three simple conical speculi, such as are used for fetal scalp blood sampling, together with a good light, are the only pieces of equipment required. It should also be possible to perform amniocentesis and carry out tests on the amniotic fluid. The shake test is a simplified method of assessing the lecithin: sphingomyelin ratio and gives an estimate of lung maturity and thus of the risks of the baby developing respiratory distress after delivery.¹⁰ Uncontaminated amniotic fluid (1 ml) is put in an 8 mm test tube. An equal volume of 95% alcohol is added and a layer of parafilm put on top, the solution is shaken vigorously for 30 seconds and then tapped to remove large bubbles. Scoring is by assessment of the foam that forms on the surface. If this forms a complete ring, the chances of respiratory distress are minimal. Gestation may be estimated by staining the fetal cells in the fluid with Nile blue sulphate; the more mature the fetus the greater the proportion of yellow staining cells.¹¹

The labour ward

The labour ward must be equipped for both normal labour and delivery and for the management of all common obstetric complications and emergencies. The advantages of allowing more mobility for the woman in labour are increasingly appreciated, together with more natural positions for delivery. Some advocate the use of a simple birthing chair or stool, in addition to a standard delivery bed that must be able to tip in the head down position. An electrical or foot suction pump must be available, and even the smallest district hospital should be able to carry out an emergency caesarean section and, if possible, keep a small blood bank.

Some form of simple partogram (such as the one shown in fig 3) is essential for recording progress in labour and is invaluable in identifying early deviations from the normal. Partograms have been used successfully in many Third World countries.¹³ Equipment for the management of normal labour includes a fetal stethoscope, gloves, clamps and scissors for the umbilical cord, and simple rubber or disposable catheters. Self retaining catheters should also be available for continuous bladder drainage after obstructed labour. Local anaesthesia and suturing equipment will be needed for perineal lacerations or episiotomy. Drugs must include pethidine, and ergometrine or syntometrine for use in the third stage. Syntocinon should also be available.

Every Third World labour ward should have a vacuum extractor (preferably the Bird modified Malmstrom vacuum extractor), which is a much safer and easier instrument to use than rotational forceps. There is no place for the latter unless a specialist obstetrician is present, but simple non-rotation forceps should be available. It is essential to keep adequate spare parts for the vacuum extractor, particularly chains and rubber tubing.

Operative delivery

Caesarean section is a dangerous operation in many parts of the Third World, not only because of the immediate morbidity and mortality but because of the risk of scar dehiscence in future pregnancies. In many societies abdominal delivery is regarded as a failure, and mothers may decide to go into labour at home next time, often with fatal results. Alternative management must therefore be considered, and there is a limited place for caesarean section solely in the interests of the fetus.

Symphysiotomy may have a part to play in the management of moderate disproportion. It is not a difficult operation, but doctors are strongly advised to read a detailed account before they attempt it.^{14 15} Unless the obstetrician is very experienced, symphysiotomy should be performed only in the second stage of labour and after a failed trial of vacuum extraction.

A few simple destructive instruments are necessary.¹⁶ Per-

foration of the fetal head may be indicated in hydrocephaly and in obstructed labour if the cervix is fully dilated and the baby is dead. A Simpson's perforator is the best instrument, together with Willett's or Morris's forceps with which to grasp the collapsed skull. Volsellum forceps or straight clamps will do if the others are not available. A Blond Heidler saw should be kept for decapitation in an obstructed, transverse lie. It is much easier to use than a decapitation hook.

Enough general surgical instruments must be available for caesarean section, hysterectomy, and repair of a ruptured uterus to be carried out. Obtaining immediate anaesthetic care in an isolated rural hospital is usually the main problem in such cases. In the absence of a skilled anaesthetist local infiltration of the abdominal wall is a safe and satisfactory technique. More detail about anaesthesia appears in another article in this series.

Maternal complications

Haemorrhage is one of the most important causes of maternal death throughout the world, and a small blood bank with facilities for cross matching is a high priority in any hospital dealing with obstetric emergencies. Apart from saline and dextrose, a small supply of a plasma expander such as Haemaccel should be stocked.

Eclampsia is rare in Europe but still common in many parts of the Third World. A gag and airway must be present in every labour ward and stocks of an anticonvulsant, such as intravenous diazepam, should be readily available. Suitable sedative drugs such as chlorpromazine and promethazine should also be stocked.

It is not unusual for women with a haemoglobin concentration of 2-3 g/dl to walk into a Third World hospital. A blood transfusion may be life saving, but this must be carefully conducted by exchange transfusion or using packed cells and a potent diuretic such as ethacrynic acid or frusemide to avoid precipitating acute heart failure.¹⁷ Basic equipment for exchange transfusion comprises two 50 ml syringes, two three-way taps, and the appropriate tubing.

For neonatal resuscitation a standard mouth sucker, an inclined table, readiness to give mouth to mouth respiration, and warmth are absolutely essential. Further details on this topic are given in a good account by Fawdry of low cost equipment.¹⁸

In this article I have not considered any expensive, modern equipment such as ultrasound scanners and electronic fetal monitoring, but if funds were available for such equipment, together with staff with the necessary skills, I would opt for a real time scanner. Its uses are wider, and it is more reliable and easier to maintain.

Fig 1 reproduced by permission from Villar J, Belizan JM, Delgado H. *Bulletin of Pan American Health Organisation* 1979;**13**, No 2:117-23.

Fig 3 reproduced by permission from Philpott RH, Castle WM. *Journal of Obstetrics and Gynaecology of the British Commonwealth* 1972;**79**:592-8.

References

- Dissevelt AG, Kornman JJCM, Vogel LC. An antenatal record for identification of high risk cases by auxiliary midwives at rural health centres. *Trop Geogr Med* 1976;**28**:251-5.
- Essex BJ, Everett VJ. Use of an action-orientated record card for antenatal screening. *Trop Doct* 1977;**7**:134-8.
- Belizan JM, Villar J, Nardin JC, Malamud J, Sainz de Vicuña L. Diagnosis of intrauterine growth retardation by a simple clinical method: measurement of uterine height. *Am J Obstet Gynecol* 1978;**131**:643-6.
- Quaranta P, Currell R, Redman CW, Robinson JS. Prediction of small for dates infants by measurement of symphysis-fundal-height. *Br J Obstet Gynaecol* 1981;**88**:115-9.
- Everett VJ. The relationship between maternal height and cephalopelvic disproportion in Dar es Salaam. *East Afr Med J* 1975;**52**:251-6.
- Watts T, Harris RR. A case-control study of stillbirths at a teaching hospital in Zambia, 1979-80: antenatal factors. *Bull WHO* 1982;**60**:971-9.
- Anonymous. Prevention of neonatal tetanus. *WHO Forum* 1982;**3**:432-3.
- Pearson JE, Weaver JB. Fetal activity and fetal well being—an evaluation. *Br Med J* 1976;**ii**:1305-9.
- Huntingford PJ, Brunello LP, Dunstan M, et al. The technique and significance of amniocentesis. *Journal of Obstetrics and Gynaecology of the British Commonwealth* 1968;**75**:610-5.
- Fairbrother P, van Middelkoop A, Carson B, et al. A simple foam test on liquor amnii to predict neonatal outcome. *Trop Doct* 1979;**9**:81-4.
- Brosens I, Gordon H. *Journal of Obstetrics and Gynaecology of the British Commonwealth* 1966;**73**:88-90.
- Philpott RH, Castle WM. Cervicographs in the management of labour in primigravida. *Journal of Obstetrics and Gynaecology of the British Commonwealth* 1972;**79**:592-8.
- Bird GC. Cervicographic management of labour in primigravidae and multigravidae with vertex presentations. *Trop Doct* 1978;**8**:78-84.
- Gebbie D. Symphysiotomy. *Clin Obstet Gynaecol* 1982;**9**:663-83.
- Kairuki HCM. The place of symphysiotomy in the treatment of disproportion in Uganda. *East Afr Med J* 1975;**52**:686-93.
- Lawson JB. Delivery of the dead or malformed fetus. *Clin Obstet Gynaecol* 1982;**9**:745-56.
- Lawson JB. Severe anaemia in pregnancy, a tropical obstetric emergency. *Trop Doct* 1971;**1**:77-9.
- Fawdry RDS. Infant resuscitation at low cost. *Trop Doct* 1983;**13**:65-9.

Recommended reading

Obstetrics and Gynaecology in the Tropics and Developing Countries: J B Lawson and Stewart. 1967. Published by Edward Arnold.
Clin Obstet Gynaecol 1982;**9**. (*Obstetric Problems in the Developing World*, ed R H Philpott.) Published by W B Saunders.
 Jelliffe, D B & E F P. *Advances in International Maternal and Child Health*: D B and E F P Jelliffe. 1981, vol 1. Oxford University Press.
Maternity Services in the Developing World—What the Community Needs. Proceedings of the seventh study group of the Royal College of Obstetricians and Gynaecologists, September 1979.

I am thinking of installing a water softener. Is there any evidence that soft water increases the risk of cardiovascular or gastric disease?

A recent review summarises the practical implications of current research on the softness of drinking water and cardiovascular disease. The main conclusions of the British Regional Heart Study confirm that there is a highly significant inverse relation between the hardness of drinking water and mortality from cardiovascular disease. This relation persists when age, sex, and socioeconomic and climatic effects are taken into account, and is not shown for mortality from non-cardiovascular diseases. After adjustment for climatic and socioeconomic factors towns with very soft water have about 10% higher cardiovascular mortality than towns with medium hard or harder water. Clearly the "water factor" is a relatively weak risk factor for cardiovascular disease compared with cigarette smoking, raised blood pressure, or raised blood cholesterol concentration. At present it is considered that cardiovascular disease mortality is influenced by water hardness or by some factor closely associated with water hardness. Whereas it is reasonable to postulate a harmful factor in soft water or a protective factor in hard water, it is also possible that the relation between hardness and cardiovascular disease

may not be causal; it may depend on an increased prevalence of other risk factors for cardiovascular disease in the soft water areas. In household water softeners the calcium and magnesium in the water are removed and replaced by an equivalent amount of sodium. An increased sodium concentration is undesirable for water used for making up infant feeds, or for consumption by individuals requiring a low salt diet. Apart from these instances, it is doubtful whether the removal of hardness is of any major consequence to health. Nevertheless, water softening can lead to increased plumbosolvency and occasionally to microbiological problems, and so the provision of a non-softened supply for drinking and cooking is regarded as desirable. This view is supported by the British Water and Effluent Treatment Plant Manufacturers Association. The studies of mortality and water hardness have shown no consistent association between stomach cancer and water hardness. There is no evidence available to suggest that there is any association between water quality and other gastric disorders.—A G SHAPER, professor of clinical epidemiology, London.

Shaper AG, Pocock SJ, Packham RF, Lacey RF, Powell P. Softness of drinking water and cardiovascular disease—practical implications of recent research. *Health Trends* 1983;**15**:22-4.