

Perinatal asphyxia: A challenge to the obstetricians

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Perinatal asphyxia results from lowered intake of oxygen before, during and just after delivery. Neurological sequelae and its severity which arises as a result of perinatal asphyxia depend on the extent of insult [1]. At the advent of modern medical technology there have been great developments in the field of obstetric management. Still there are significant numbers of cases suffering from perinatal asphyxia. In India, the perinatal mortality rate and still birth rate are 48.5 per 1000 live births and 19.2 per 1000 pregnancies [2].

Hypoxic ischaemic encephalopathy

This disorder results from compromised placental and pulmonary gas exchange which leads to hypoxia and hypercarbia in the blood. Severe hypoxia results in anaerobic glycolysis and lactic acid production - first in the peripheral tissues and then in the brain. Ischaemia is both a cause and a result of hypoxia. Hypoxia and acidosis can develop myocardial fluctuations leading to hypotension and ischaemia. Ischaemia can impair oxygen delivery leading to further compromise, as well as disrupt delivery of substrate and removal of metabolic and respiratory by products e.g. lactic acid, carbon dioxide [3].

Antenatal care (ANC)

Adequate ANC can prevent a significant number of cases. The important points in this

regards are: i) screening of high risk patients with timely interventions, ii) detecting intra uterine growth restriction (IUGR) cases and treating promptly.

Intranatal care

This is of paramount importance to detect asphyxia at the earliest moment and to prevent its occurrence by the following ways: i) close monitoring ii) appropriate care for early detection of complications like prolonged labour, placental abruption, placenta praevia, foetal malfunction, foetal distress etc and timely intervention by prophylactic forceps, caesarian section etc.

Antenatal foetal monitoring [4]

Besides routine examination of the patient and biochemical parameters, the following are useful -

i) *DFMC (Daily Foetal Movement Count and Kick count)*: DFMC as counting to 10 at a stretch or hourly count in 3 divided period of the day is very helpful.

ii) *CTG (Cardio tocography)*: CTG is a device in which foetal heart sound (FHS) pattern is recorded simultaneously with uterine contraction. It is helpful to find out the at risk foetus for further monitoring or immediate intervention. Admission test for all patients for 20 minutes are not done routinely now a days. Continuous CTG monitoring in selected high risk patient is necessary.

iii) *VAST (Vibroacoustic stimulation test)*: VAST by stimulating the foetus with ultrasound pulses. The FHS variation response is observed.

iv) *Foetal biophysical screening*: This is assessed ultrasonographically on the basis of 5 parameters attributing maximum 2 scores to each (viz liquor volume, FHS, foetal body movements, foetal tone, foetal respiratory movements)

v) *NST (Non stress test)*: NST is the FHS variation in response to foetal movements is observed.

vi) *Doppler study of foetal vessels*: Umbilical vessels, middle cerebral vessels and occasionally ductus venosus are mostly studied. Usually in compromised foetus diastolic flow is observed as follows –

a) Reduced diastolic flow – to be reviewed after 1 week. Usually after a period of 9 days it goes to the next step which is dangerous to the foetus.

b) Absent diastolic flow - action should be taken at this stage.

c) Reversed diastolic flow - once this stage is attained, foetus dies within 24 to 48 hours.

Uterine artery doppler showing diastolic notch after 22 weeks of gestation is an indication of pregnancy induced hypertension (PIH) or pre-eclampsia developing very soon with a poor prognosis.

vii) *Foetal echocardiography*: In selective cases of foetal heart block or arrhythmia, this is of great help in guiding the future course of treatment.

viii) *Fetoscopy*: Samples from the foetal umbilical cord blood or tissue can be obtained by fetoscope for diagnosis; transfusion of blood can be done or certain special surgical procedures may be performed. All these help in preventing asphyxia.

Intrapartum foetal monitoring

Foetal monitoring during intranatal period is of paramount importance as follows -

i) Intermittent auscultation at 15 min interval in 1st stage and at 5 minute interval at 2nd stage of labour after the contraction.

ii) Cardiotocography: In selected cases intermittently or continuously.

iii) Continuous electronic foetal monitoring: Recording foetal electrocardiogram (ECG) with an electrode on the foetal scalp and intrauterine pressure by a probe in the uterine cavity continuously.

iv) Vibro acoustic stimulation

v) Scalp stimulation test

vi) Foetal scalp blood sampling to ascertain the pH level of the blood.

Other methods foetal monitoring

Besides the conventional methods many other methods are under trial or in practise as follows - Foetal ECG, Pulse oximetry, Lactic measurements, Doppler velocimetry, Near InfraRed Spectroscopy (NIRS). NIRS is a newer method which is under trial at this time, but yet is not commercially available. It involves the principle of comparing the ration of oxygen and carboxyhemoglobin in the tissue. It is the only method which gives real impression of oxygen uptake capacity of the brain tissue [5].

Obstetric Drills

This type of exercises are to be organised in strategic centres to ensure adequate equipment supply, availability of medicines etc and availability of trained staff.

Perinatal death audits

In the tertiary and secondary centres perinatal death audits should be organised at regular intervals of 1st week or fortnight or at least once in a month. It helps in evaluating the cause of death and explore means of prevention.

Miscellaneous

Other points also to be considered are as follows:

a) Prevent Malaria by public health measures

b) Detect diabetes by glucose challenge test or by routine screening.

c) Treating intra hepatic cholestasis promptly

d) Premature rupture of membranes is to be treated aggressively according to the culture report of high vaginal swab

e) Expedite delivery within 30 minutes of detection

f) Caesarian section in eclampsia or severe preeclampsia

g) Timely referral of potential candidates for asphyxia to a tertiary care centre

- h) Prophylactic forceps
- i) Liberal incision of caesarian section for preterm foetus
- j) Management of breech delivery by skilled obstetricians

Resuscitatory measures: After asphyxia status, to buy time the following measures are employed in selective candidates [6].

A) Left lateral position, B) To inhibit uterine contractions: stop oxytocin if going on, remove misoprostol tablet if given locally, to start tocolysis by isoxsuprine hydrochloride, C) Maternal hydration by ringer lactate infusion, D) Amnio-infusion with normal saline (NS) when there is oligohydramnios or drained out liquor due to premature rupture of membrane (PROM), E) Maternal oxygen therapy, F) Foetal Scalp blood sampling.

Conclusion

Obstetrician can play a major role in prevention of perinatal asphyxia and can help in averting many major neurosurgical sequale of asphyxia by early detection of perinatal asphyxia. Early detection of obstetrical complications is a must to prevent this problem.

Timely intervention by the obstetrician in 3 key procedures viz. induction of labour, instrumental delivery and caesarian section is essential to prevent asphyxia.

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