Foetal blood sampling in clinical foetal distress

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THE PATIENT IN labour who develops clinical signs of foetal distress poses problems in management because, amongst other things, signs such as abnormal foetal heart rate and meconium-stained liquor do not correlate well with the infant's condition at birth (Wood and Pinkerton, 1961; Day et al, 1968). A more precise method for detecting foetal acidosis is by foetal scalp blood sampling introduced by Saling (1965). We have recently performed foetal blood sampling in cases of clinical foetal distress in order to confirm or exclude the presence of foetal anoxia, and to assess its use in the management of these patients.

Technique and Results

The essential steps are similar to those described by Beard and Morris (1965) and Beard (1970). Under sterile conditions, an amnioscope is introduced through the cervix to rest against the foetal scalp. The scalp area is cleaned with small gauze swabs, sprayed with ethychloride, and finally painted with silicone or liquid paraffin. A small incision is made on the scalp with the blade. A droplet of blood forms at the puncture site and a capillary blood sample is obtained through the amnioscope. The instruments used in this procedure are shown in Figure 1. The acid-base status of the foetal blood is determined with the Astrup micro-pH meter.

Foetal blood sampling during labour is indicated in clinical foetal distress in high risk conditions, including cases of intrauterine growth retardation and in patients who had low urinary oestriol excretion during pregnancy (Fliegner et al, 1970). Repeat sampling is carried out if necessary during labour until delivery is completed. The results of 12 patients who had foetal blood sampling done and the foetal outcome are shown in Table I.

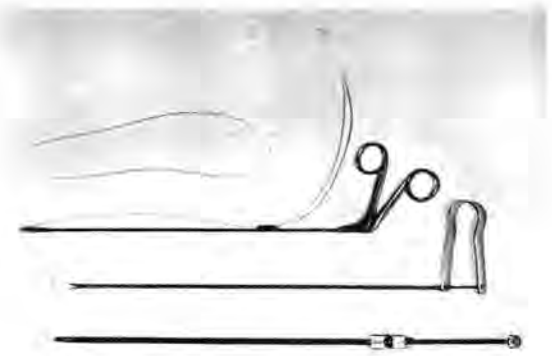

Fig. 1
Instruments for foetal scalp blood sampling

TABLE I

CASES WITH CLINICAL FOETAL DISTRESS SHOWING THE FOETAL pH AND APGAR SCORE AT BIRTH

Case	Foetal Heart Rate	Liquor* Amnii	Foetal pH	Cervical Dilatation (cm.)	Apgar Score at 1, 5 mins.
1.	>160	M	7.24	4	3
2.	Normal	M	(7.32	4)	8, 10
			(7.24	8)	
3.	Irregular	M	7.35	4	10, 10
4.	Irregular	M	7.36	4	9, 10
5.	Normal	M	7.44	4	9, 10
6.	Irregular	M	7.37	6	10, 10
7.	>160	M	7.35	3	7, 10
8.	Irregular	M	7.36	4	8, 10
9.	>160	M	7.34	2	9, 10
10.	>160	M	7.41	3	10, 10
11.	>160	M	7.38	6	9,10
12.	>160	C	7.37	4	6,10

*M — Meconium-stained

C — Clear

Discussion

All the 12 patients showed evidence of clinical foetal distress. Of these, only Cases 1 and 2 have a low pH. Caesarean section was done in Case 1 and the Apgar score of the baby was 3. In Case 2, the foetal blood pH was 7.32 at 4 cm. cervical dilatation but was 7.24 at 8 cm. dilatation. Ventouse delivery was performed immediately and the baby's Apgar was 8 at 1 minute. In all the other patients, the foetal blood pH was normal, and labour was allowed to progress. They all delivered vaginally except for Cases 10 and 11 where Caesarean section was subsequently done for failure of progress of labour. Case 12 had Caesarean section for prolonged labour and intrapartum maternal pyrexia. In all cases, where the foetal blood pH was normal, the foetal condition at birth was good with a high Apgar score. In clinical practice, when there is a combination of foetal heart irregularity, tachycardia or bradycardia coupled with meconium-stained liquor, this calls for some operative procedure to deliver the foetus as soon as possible. Caesarean section would be done if the cervix is not fully dilated. If foetal scalp blood sampling was not done, all these patients might have had Caesarean section performed for clinical foetal distress. Similar findings have been reported by other workers. Due to the more precise diagnosis of intrapartum foetal hypoxia by pH, Beard (1968) has reported a reduction in the Caesarean section rate for foetal distress by over 50 per cent at Queen Charlotte's Hospital in London.

The management of patients with foetal distress has been well documented by Coltart et al (1969). If the pH was normal (greater than 7.25), labour was allowed to continue. If the pH was between 7.25 and 7.20, a further sample was collected within 30 minutes. If the pH was below 7.20, operative delivery was undertaken. Beard and Morris (1969), reporting on perinatal mortality among babies weighing more than 1,500 gms., showed that in the five years following the introduction of foetal blood sampling, the perinatal death underwent a significant fall compared with the previous years.

Lumley and Wood (1969), and Fliegner et al (1970) have shown that foetal blood sampling is a useful technique for detecting foetal acidosis in the first stage of labour. Fliegner et al (1970) have demonstrated its usefulness at the time of amniotomy (A.R.M.) in high risk cases, and the importance of serial estimations during labour for management of cases with clinical foetal distress. It has been shown that there is significant correlation between the foetal pH and baby's condition at birth (Beard et al, 1966). Greater accuracy in the detection of intrapartum foe-

tal anoxia by foetal blood sampling compared to clinical diagnostic criteria has been shown in cases with foetal distress and also in cases with hypertension and proteinuria (Wood et al, 1968; Wood, 1969).

Summary

The technique of foetal blood sampling during labour is described. This is a useful diagnostic aid for the detection of foetal acidosis (chemical foetal distress) in cases of clinical foetal distress and high risk pregnancies, with special reference to placental insufficiency syndrome.

When foetal anoxia is confirmed, operative delivery should be performed quickly to avoid perinatal deaths; when there is no biochemical confirmation of foetal anoxia, unnecessary Caesarean sections can be avoided.

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