Summary

A group of subfertile patients with associated varicocele is discussed.

The operation used in all patients was high ligation of the main spermatic vessels. This operation is simple, effective, and without danger to the testicle.

The number of cases presented is small, but it is some years since the first operation was done, and to collect a large series is a slow procedure.

From the results obtained it seems justifiable that where a varicocele is associated with subfertility the varicocele should be cured.

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FOETAL DISTRESS AND INTRA-PARTUM FOETAL DEATH

BY

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The loss of the child during labour is particularly tragic to the mother, when she has carried and nourished her baby for so many months; the prevention of such tragedies must depend on the successful anticipation of any threat and on proper and timely aid. The signs of distress of the baby *in utero* are derived from the foetal heart sounds and from the reaction of the gut to anoxia. It is the purpose of this investigation to examine the problem from a clinical point of view, and to this end 206 cases of foetal distress extracted from 3,168 deliveries (an incidence of 6.5%) have been analysed. A section of these cases (1,833 deliveries with 128 cases of distress) were specially investigated with regard to predisposing factors.

Von Winckel (1903) stated that a foetal heart rate above 160 or below 100 a minute should be regarded as a sign of distress, and this is still generally taught in this country. Stander (1941) accepts the same criteria, but Lund (1940) has suggested that foetal tachycardia is of little or no significance. In a later study Lund (1943) followed the foetal heart through labour in 250 women and found a transient tachycardia in 17.6% and persistent tachycardia in 5.6%. He was unable to find any relation between this and the stillbirths, neonatal deaths, and asphyxias on delivery. Canon *et al.* (1952), in a more extensive and detailed investigation, support these views.

The general impression gained from the literature is, firstly, its scarcity considering the importance of the subject, and, secondly, the extreme vagueness and lack of guidance from the clinical point of view.

Criteria of Distress

(1) Slowing of the heart rate to 100 a minute or less as proposed by Von Winckel will result in a high proportion of severe distress in the cases so selected; it will also result in the detection of many cases at too late a stage for effective action. In the present series, cases showing a fall in rate to 110 or less were included, but, within the series so obtained, note has been taken of rates below 120 where the rate has been steadily in the region of 140 at the start of labour.

(2) Rise in heart rate to 160 a minute or more has been accepted for inclusion in this series. As has been pointed out earlier, Lund and others would disagree with this criterion, which is that originally suggested by Von Winckel and accepted still by such authorities as Stander (1941) and Baird (1950). In this series, moreover, rates of 150, where the rate has been previously steady in the region of 140, are regarded as worthy of note.

(3) Arrhythmias are of two types: (*a*) irregularities of rhythm of a rapidly varying kind; and (*b*) wide swings in rate, with a given rate maintained over several minutes at a time. All such cases have been included in the present series.

(4) Variation of rate with uterine contractions should constitute a most valuable and early sign, but it is difficult to obtain satisfactory observations from the busy midwife, and she is mainly responsible for making the necessary records. For this reason it has not been possible to use the sign in this series.

(5) The passage of meconium in vertex presentations occurs in two degrees of severity, recognized clinically by the terms "meconium staining" and "frank meconium" in the liquor amnii. In the former the liquor is a greenish or greenish-yellow colour owing to the passage of small quantities of meconium over a relatively long period of time. If frank meconium is present a considerable quantity has been passed in a short space of time into the liquor amnii, and this finding would be generally accepted as of serious significance. Many would regard meconium staining of the liquor as scarcely worthy of note, but all such cases have been included in this series, and its significance is discussed later.

Routine for Detection of Distress

The following points are stressed in the detection of these signs of distress during labour.

(1) All cases with meconium in the liquor amnii in cephalic presentations, even if staining only is present, should be reported promptly to the medical staff, and thereafter the foetal heart rate should be charted graphically.

(2) The foetal heart sounds should not be noted merely as "F.H.H." or "foetal heart heard," as is a common practice, but the rate should always be counted at each observation. If this is done it will also ensure that the sounds are auscultated for long enough for arrhythmias to be noticed. Special care—that is, a foetal heart chart and more frequent auscultation—should be instituted where the rate rises to 160 or drops to 120 a minute. Where the rate has been steady between 140 and 150, as is often the case, then a consistent rise above 150 or a fall below 130 should lead to increased vigilance.

(3) Where there is reason to expect distress owing to the presence of predisposing factors (see below) the heart rate should be plotted on a graph chart so that trends are made obvious to the obstetrician who is visiting the case intermittently or for the first time. The blood pressure and albumin record form as used in University College Hospital has been found very satisfactory for this chart. In the normal case the rate is noted at hourly intervals in the first stage, and at quarter-hourly intervals in the second stage; in the suspect case these intervals will be shortened.

(4) The preceding suggestions represent minimal requirements; it may be possible for the alert midwife to chart the response of the heart to contractions as a routine, instead of as an occasional observation. This needs time and judgment, and might best be done by a continuously recording cardiograph.

Predisposing Factors

The effect of maternal age, parity, toxaemia, ante-partum bleeding, and maturity has been examined in 128 cases extracted from 1,833 consecutive deliveries.

Maternal Age.—Cases were grouped into those over 30 and those under 30 years of age. In the older group an incidence of distress of 8% was found as compared with 6.5% in the younger women ; the difference is not statistically significant.

Parity.—There is a statistically significant difference between primigravidae and multigravidae, the former showing 8.9% and the latter 4.6% of distress. It is thought that this may be due to the increased soft-tissue pressure on the foetal head, and also to the greater uterine tone normally present in the primigravidae.

Ante-partum Bleeding.—This group includes all cases of uterine bleeding prior to the onset of labour, where the child was alive at the start of labour. It therefore excludes all cases of severe accidental haemorrhage and includes a large majority of cases of bleeding of the threatened abortion variety. It seemed likely that there might be some degree of placental infarction or other damage in these cases, predisposing to foetal anoxaemia. There was an incidence of 13.1% distress in this type of case, as compared with 6.1% where there was no such bleeding, and this is statistically significant.

Toxaemia.—The standard for this has been a blood pressure of 150/100 or more with or without albuminuria. Toxaemic cases show an incidence of 8.4% compared with 6.7% in the non-toxaemic group, which is not statistically significant. It is surprising that this difference is not more pronounced, and it is probable that certain favourable factors are tending to cloak the toxaemic effect.

Maturity.—Two groups were collected on a basis of the expected date of delivery ; those occurring 14 or more days before this being designated " premature," and those 14 or more days after that date being designated " post-mature." An incidence of distress in the post-mature group of 13.4%, as compared with 8.4% in the premature and the overall incidence of 6.5%, is statistically significant. This is in agreement with the findings of McKiddie (1949) and of Clayton (1953).

Signs and Sequences

The five main signs of distress have been investigated for their individual significance, and also for their significance in certain sequences. Where the condition of the child at delivery had been noted as stillborn, poor, or fair only, the child is classified as " affected "—that is, adversely—and where the condition was described as good the child is classified as " not affected."

It was found that when meconium staining was noted 44% of the babies were affected ; with frank meconium the corresponding figure was 69% ; with a raised heart rate (160 a minute or more), 62% ; and with a slowed rate (120 a minute or less), 56%. With irregular rhythm 59% were affected.

There were 10 cases in which slowing of the foetal heart followed an initial rise, and 13 in which a rise followed slowing ; this does not support the widespread impression that the first of these sequences is very frequent or more " typical " of distress than the other combination. The rise followed by fall in rate had a 44% incidence of affected infants ; the reverse sequence seemed more serious with 60% affected.

Analysis of Stillbirths in Labour

There were 45 cases of foetal death in labour, this being 37% of all stillbirths in this period ; this is a surprisingly large proportion of the total stillbirths and indicates an important field for salvage. Where signs of distress had been properly looked for, only 3 cases out of 26 suffered foetal death without warning. Of 19 deaths *in utero* thought to have shown no warning, none had been watched with the standard of care which is regarded as desirable.

The stillbirths were attributed to accidental haemorrhage (3 cases), toxaemia (3), congenital anomalies (10), breech delivery (4), difficult forceps (1), prematurity (3), placenta praevia (1), umbilical cord complications (11), and " not known " (9). The frequency of cord complications and the group not known are of especial interest, while the incidence of congenital anomalies is to be expected and must be constantly borne in mind.

It was found that the foetal deaths were roughly equally distributed between the first and second stages of labour, with 21 deaths in the first stage and 24 in the second stage.

Umbilical Cord Complications

The frequency of cord complications in the group of stillbirths in labour has just been mentioned ; in this series of foetal distress cases there were 58 cord complications, giving an incidence of 28%, and in 54 of these there was no other obvious cause of distress.

Of these 58 cases, there were one or more turns around the neck in 47 cases, true knots in 5, prolapsed cord in 7, and a short cord in 4. In these 58 cases there was a foetal loss of 9 stillbirths and 1 neonatal death.

There is an interesting report by Clemetson (1953) of estimation of the oxygen content of cord vein and artery blood ; his results show clearly how seriously foetal oxygenation can be affected by " cord around the neck." The otherwise healthy foetus with no additional adverse factors may survive, but if this effect is added to a pre-existing anoxia the result may well be lethal.

Treatment

Assessment of the effects of treatment is difficult without a control series ; in many respects those cases which received no treatment apart from possible episiotomy do offer a control, if it be remembered there will be a loading of the more severe cases in the treated group. It must also be emphasized that a factor of the greatest importance is the timing of intervention, which is as important as the mode of treatment itself. Thus it is considered that two of the stillbirths from caesarean section could have been saved if the same action had been taken somewhat earlier. It should also be recognized that the fact that a child cries vigorously at birth is no guarantee that it has not been in danger, since, provided that the anoxia is not too extreme, the initial effect may be stimulant.

Analysis of methods of treatment shows that a policy of non-intervention—that is, normal delivery with or without episiotomy—is associated with an incidence of 25% stillbirths, whilst in the group delivered by forceps or caesarean section, in spite of loading of this group with the more severe cases, the stillbirth incidence is reduced to 13%.

An even more emphatic presentation of these facts is given by examination of a group of elderly primigravidae, there being 43 such cases in 206 cases of foetal distress. As might be expected, active intervention was practised more frequently and with less delay than in other cases. In 12 cases of non-intervention there were 3 stillbirths—that is, 25% ; in 31 cases of forceps or caesarean delivery there was 1 stillbirth, an incidence of 3%.

Waters and Harris (1931) were the first to point out the beneficial effects of inhalation of high concentrations of oxygen by the mother. The experience gained in this series suggests that, though in some cases the oxygen may enable the baby to survive until delivery, in others it may only delay the tragedy, as the temporary improvement obtained may lead to postponement of action until too late. This occurred in one of the stillbirths lost at caesarean section (Fig. 1). It is felt that it is better to regard the use of oxygen in well-marked distress as a means to ward off disaster while preparations for immediate delivery are made.

In this series it has thus been shown that a considerable improvement was obtained in the foetal salvage where active intervention was judiciously practised.

It seems likely that results can be further improved (a) by even more methodical vigilance; and (b) by improvement in the timing of intervention; thus there was a loss of 6

FIG. 1.—Foetal heart chart. Primigravida aged 41. Temporary oxygen effect. Stillbirth.

FIG. 2.—Foetal heart chart. Normal primigravida aged 22. Distress after 15 hours in labour. Stillborn child: no gross congenital anomalies.

babies in 67 forceps deliveries, of which 2 infants might have been saved by earlier action. Of 31 caesarean sections for distress, 3 babies were lost; reviewing these, it is thought that earlier operation would have saved 2 of these stillbirths.

Discussion

Cases of foetal distress present some of the most difficult clinical problems because of the variability of the physical signs and of the limited information available. To adopt the view that, since accurate assessment and prognosis is not at present possible, conservative measures should be adopted is not borne out by the present series, which strongly support the value of timely intervention (Figs. 3 and 4). In the present state of knowledge one is faced with the necessity of being prepared to act on the basis of probabilities, or of accepting a quota of avoidable foetal deaths or damaged children.

There is great need of the valuable additional information which might be supplied by continuous recording foetal phonocardiography or electrocardiography, with particular reference to the effect of the uterine contractions; a study of rates and rhythms over the whole or long periods of labour should be carried out.

In addition to the physical signs observed, decisions on treatment will be based on every possible relevant factor such as age, infertility, and so on.
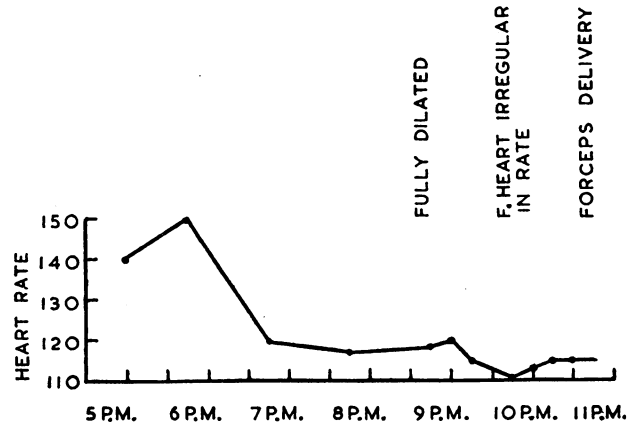

FIG. 3.—Normal primigravida aged 23. Foetal heart regular at about 140 prior to events in this chart. Forceps delivery for transverse arrest was not difficult, but was too late. Stillbirth.
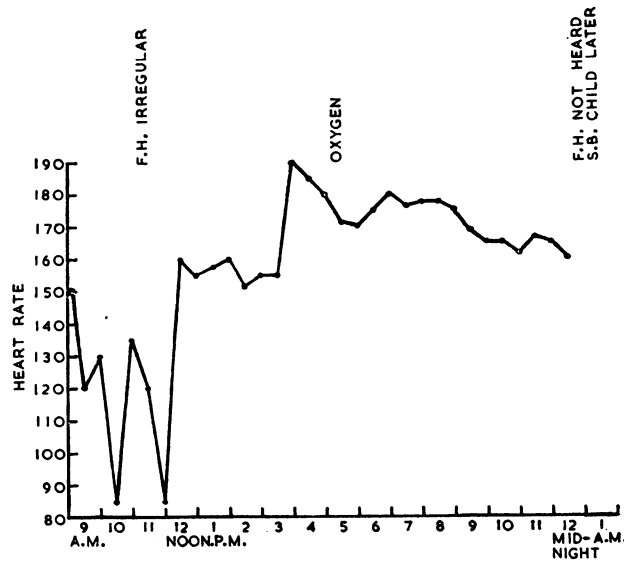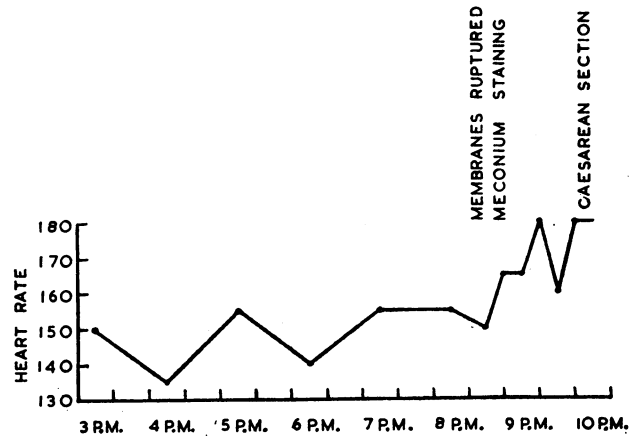

FIG. 4.—Foetal heart chart. Same patient whose first labour is shown in Fig. 3. Living child in good condition delivered by caesarean section. (The onset of signs of distress immediately after rupture of the membranes is not infrequent.)

Summary

Foetal distress and its associated problem of foetal death in labour have been investigated from the clinical point of view.

206 cases of foetal distress extracted from 3,168 hospital deliveries were detected during the routine care of patients by the midwifery staff, without special instruments or training.

Possible predisposing causes of age, parity, toxaemia, maturity, and ante-partum bleeding are subjected to statistical examination.

The signs of foetal distress during labour are analysed for their individual significance and for their significance when they occur in certain sequences.

Treatment and its results are described and discussed; the advantages of active intervention in many cases is suggested.

Suggestions are made regarding possible lines along which progress might be made towards more rapid and accurate diagnosis with a resultant improvement in treatment and results.

As has been pointed out in the text, the bulk of the routine observations are the work of the midwifery staff, past and present, to whom we express our appreciation and thanks. Dr. A. S. Simpson, divisional medical officer for Ashton-under-Lyne, has been responsible for the statistical analyses, for which we are most grateful, and Dr. Ruth FitzGerald has been of the greatest help in the preparation and revision of the text.

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LEFT ATRIAL TUMOUR SIMULATING MITRAL STENOSIS

BY

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Primary cardiac tumours are quite uncommon, but are now being reported with increasing frequency. On occasion surgical removal may be possible when mechanical obstruction occurs, but pre-operative diagnosis is difficult and is usually reached only at exploratory cardiotomy. The case here described manifested some of the features of rheumatic mitral stenosis, but valvular disease was not detected at operation. The diagnosis of a localized cardiac tumour, usually a myxoma, producing obstruction is now more than of academic interest, and similar cases may be encountered from time to time in thoracic surgical units, where cardiotomy is now a routine procedure. Anomalous signs such as were found in this case may enable a pre-operative diagnosis to be made and so facilitate radical removal in a planned operation.

Case Report

A woman of 48 was first seen in April, 1953, when she complained of gradually progressive dyspnoea of five months' duration. She had previously been healthy, having had two uneventful pregnancies, and gave no history of rheumatic infection. She had noticed increasing pallor and had a little cough with occasional slight haemoptyses. Exertional dyspnoea was severe, with considerable orthopnoea, and several attacks suggestive of acute paroxysmal dyspnoea had occurred. Fatigue was also a prominent symptom. Apart from a vague constant left submammary ache, true cardiac ischaemic pain had occurred often. There had been no syncopal attacks and no embolic accidents.

She was a frail pallid woman, showing no cyanosis, jugular engorgement, or peripheral oedema. The heart rhythm was regular and the blood pressure 120/80. The apex beat was tapping in quality with a slight thrust, and there was a pronounced left parasternal heave. The mitral first sound was accentuated and a late mitral diastolic murmur (grade 2) was audible. This varied a little with posture, being best heard in the left lateral position after exercise.

No apical systolic murmur was heard. The basal second sound was loud, but no basal diastolic murmur or clear opening snap was audible. Apart from a few coarse moist sounds over the chest, the rest of the physical examination was negative.

Cardioscopy revealed considerable enlargement of the right ventricle with little or no atrial enlargement and no visible calcification. The lung fields showed evidence of severe pulmonary hypertension, with large pulmonary arteries, peripheral vascular attenuation, and prominent basal lines B of Kerley. The radiologist (Dr. E. L. Rubin) was of the opinion that the radiological appearances were unlike those of true mitral stenosis.

Cardiac catheterization was undertaken, and the mean pulmonary artery pressure was 80 mm. Hg, and the pulmonary capillary pressure 44 mm. Hg. There was no evidence of intracardiac shunt. The electrocardiogram showed right ventricular hypertrophy pattern in the unipolar chest leads.

With some reservations, owing to the several anomalous features of the case, the patient was submitted to cardiotomy. This was undertaken by Mr. Ronald Edwards on January 5, 1954, when a pedunculated tumour was palpated in the left atrium, arising from the septum. This was acting in the manner of a ball-valve, plunging into the mitral orifice with each auricular systole. The tumour was friable and, in view of the danger of embolism, removal could not be undertaken; the chest was therefore closed. A more radical operation was to be attempted later under hypothermic anaesthesia, but the patient died of acute pulmonary oedema on the second post-operative day.

Necropsy.—Both lungs were oedematous, with some discrete areas of consolidation. On section the alveolar walls were thickened and the pulmonary vessels hypertrophied. Pigment-containing macrophages were present in many of the alveoli. An infarct, presumed to be a few days old, was present in the left kidney. The left thyroid lobe contained a small colloid adenoma. The right ventricle of the heart was hypertrophied and dilated, the wall being 7 mm. in thickness. The left atrium was almost completely filled with a tumour, 16 by 40 by 25 mm. in size, which was adherent to the atrial wall at the site of the
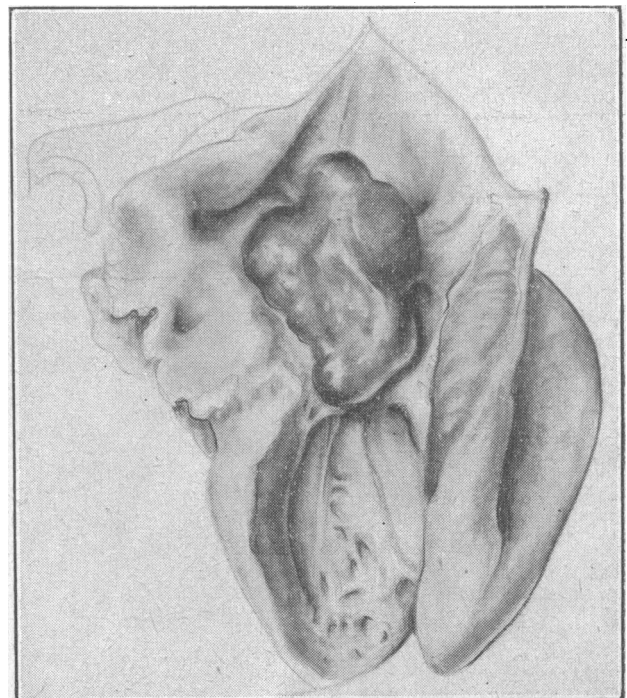
Drawing of the heart, displaying the atrial tumour entering the left ventricular cavity through the mitral orifice.