

THE CLINICAL USE OF RADIOLOGY IN PLACENTA PRAEVA

A Review of 433 Cases of Ante-partum Haemorrhage Examined Radiologically (1951-1954)

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DURING recent years radiology has assumed increasing importance in the diagnosis and management of placenta praevia by localizing the placental site. In the Simpson Memorial Maternity Pavilion a 4-year follow-up and review of all cases X-rayed for possible placenta praevia has been completed and an attempt to correlate the radiological report with the subsequent obstetrical findings has been made. Several interesting features have been revealed by this review and these are presented in this report.

A marked increase in the utilization of radiology in the diagnosis of placenta praevia is immediately apparent. In 1951, of the 140 cases of ante-partum haemorrhage admitted to hospital, 71 cases were X-rayed whereas in 1954, out of the 149 admissions for ante-partum haemorrhage, 138 cases were investigated radiologically. The total admissions to the hospital for these years were 4,132 and 4,253 cases respectively.

There were a number of cases of proved placenta praevia which were not X-rayed, although in-patients for varying periods prior to delivery, and these are shown in Figure 1. In 1950 there were 14 such patients in hospital for an average of 11 days before delivery. The number of cases in this category gradually dropped, until in 1953 there were only 2 patients who were not X-rayed and these were in hospital

for only 1 or 2 hours before delivery. In 1954 the figures were 4 cases with an average of 3 hours hospitalization. In the latter cases the severity of bleeding created an emergency and suggested the probable clinical diagnosis of placenta praevia. It was considered that any delay in dealing with the emergency in order to permit an X-ray examination was unjustifiable.

Another interesting feature revealed in this study concerned the estimated period of gestation at which time the radiological diagnosis of placenta praevia was made, and subsequently confirmed on clinical evidence. This is shown in Figure 2.

In 1952 most cases of ante-partum haemorrhage were X-rayed at or near term, whereas in 1954 the majority were X-rayed at or about 32 weeks. This difference indicated the increasing use of radiological examination as a means of planning the management of cases of ante-partum haemorrhage by the obstetrician. Patients admitted to hospital with ante-partum haemorrhage are examined radiologically at the earliest opportunity and in many cases their stay in hospital can be reduced when placenta praevia is excluded. Placenta praevia is difficult to diagnose or exclude radiologically before the foetus has attained an estimated maturity of 32 weeks. The findings of radiological examinations carried out before this time are usually verified by re-examination after the 32nd week.

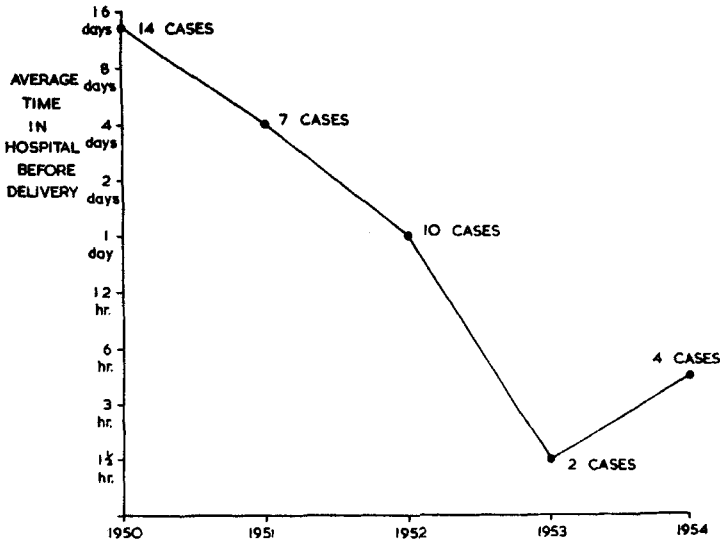


FIG. 1

Number of cases of placenta praevia not X-rayed and with average time in hospital before delivery.

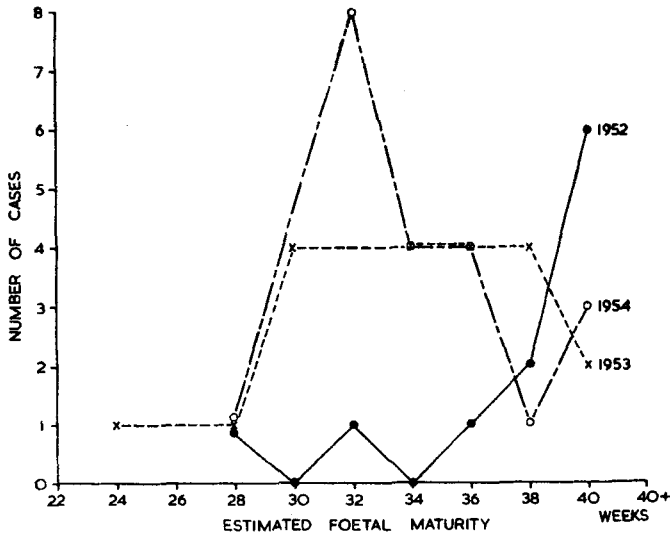


FIG. 2

Estimated period of gestation at which placenta praevia was diagnosed radiologically.

It is not intended that this paper should include full details of radiological technique. The principle underlying modern technique however must be appreciated by the clinician if he is to understand the X-ray report. The principle is simple; the placenta occupies space.

Where there is no space available there is therefore no placenta; where there is space available it is possibly occupied by the placenta. In investigating a patient in whom placenta praevia is suspected an attempt is firstly made to show that there is no space between the presenting

part and the brim of the pelvis and thereby placenta praevia is excluded. If there is space between the presenting part and the brim of the pelvis, other explanations, such as full bladder, full rectum, soft tissue tumours, etc., must be considered and excluded if possible.

TECHNIQUE

The technique adopted in the Department relies entirely on straight radiography with the foetus acting as if it were a contrast medium. The uterus, placenta and liquor amnii are all of the same radiographic density, but the foetus, which is of a higher specific gravity, has a different radiographic density in its bones and subcutaneous fat. Views are taken with the patient in such a position that the foetus is above the suspected soft tissue shadow. Under gravity the foetus will sink to the most dependent part displacing any liquor amnii but not displacing the placenta. This soft tissue technique has been described in various publications (Whitehead, 1953; Reid, 1949, 1952, 1953) to which readers may refer for details.

Difficulties arise when there is a relative excess of liquor amnii masking the placenta as in early pregnancy and in hydramnios. Extrinsic soft tissue masses are confusing and it is therefore important that the bladder and rectum be emptied prior to radiological examination. Other soft tissue masses, such as uterine fibroids or ovarian cysts, simulate the placenta and their presence can only be suspected radiologically by their shape and position. When these complications are not present the information obtained from the radiological examination is definite and reliable.

RADIOLOGICAL CLASSIFICATION

The classification which we have now adopted in reporting placenta praevia is shown in Figure 3. The lower uterine segment in the latter months of pregnancy is considered to lie at the pelvic brim posteriorly and about 1 inch above the brim anteriorly. In Type I placenta praevia the mass of the placenta is above the brim with the margin dipping down into the pelvis slightly displacing the presenting part. Anteriorly there may be normal separation of the foetus from the symphysis, but when the main mass of the

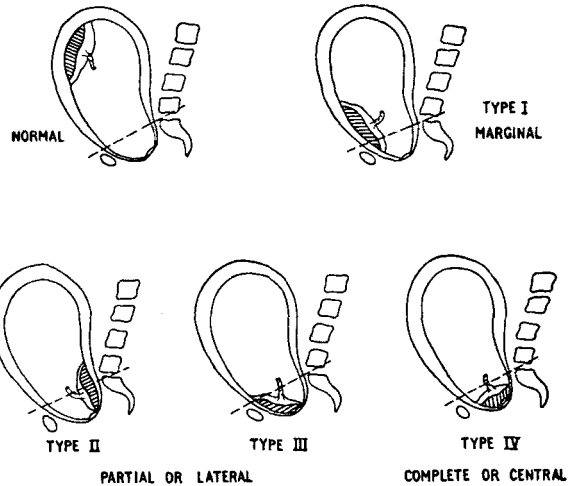


FIG. 3

Classification of placenta praevia.

placenta is immediately above the brim it is considered to be a Type I placenta praevia. In Type II placenta praevia the mass of the placenta is at the brim with the margin unlikely to extend as far as the internal os. In Type III the mass of the placenta is slightly below the brim with the margin probably covering the internal os. In Type IV the mass of the placenta is in the pelvis.

Radiological typing is thus determined by the position of the mass of the placenta in contrast to obstetrical classifications which are determined by the position of the margin of the placenta. This difference is due to the fact that it is not possible to visualize the placental margins radiologically except when calcification is evident. Radiological and clinical classifications therefore may not always agree but the discrepancy should not be greater than one type. The greatest difficulties in discrimination are between Type I and no placenta praevia, and between Type II and Type III placenta praevia.

REVIEW AND FOLLOW-UP

All cases X-rayed for possible placenta praevia during the 4-year period 1951 to 1954 were reviewed. The X-ray report made at the time of the radiological examination was correlated with the final clinical diagnosis which is made by a senior member of the obstetrical staff.

The results fall into three main groups: placenta praevia not present; definite placenta praevia Types II, III and IV; indefinite or uncertain placenta praevia. These latter cases were variously reported; Type I, possibly Type I, or possibly Type I or II. Altogether 433 cases were X-rayed in this period and these are listed in Figure 4.

The first group to be considered consists of 296 cases where the radiological examination reported "no placenta praevia". Scrutiny of case records revealed that in 293 cases placenta praevia was excluded clinically. The remaining 3 were classified obstetrically as placenta praevia. The first case, a Type II posterior, showed at the radiological examination an abnormal quantity of gas in the rectum and this was accepted as the cause for separation of the foetus from the promontory. The other 2 were Type I, 1 of which revealed a definite soft tissue shadow immediately above the pubic symphysis in the lateral film. This would now be reported as a Type I anterior placenta praevia. Thus radiology can show almost 100 per cent accuracy in excluding placenta praevia.

In the group reported radiologically as possibly Type I, Type I, or possibly Type I or II placenta praevia the difficulty in differentiating Type I and no placenta praevia is shown. In many cases of radiologically Type I placenta praevia there is no clinical indication for exploration of the lower uterine segment as the patient commences labour spontaneously without recurrence of bleeding. Thus in many

instances there is no means of verifying the radiological opinion.

The group reported Type II, III or IV is shown in more detail in Figure 5. From this Figure it will be seen that in all a total of 54 cases were reported Type II, III, or IV placenta praevia and of these 42 cases were "confirmed". The term confirmed means that the case had been reported radiologically as the same type of placenta praevia as was subsequently classified obstetrically or was accurate to within one type. The 12 cases which were not placenta praevia demonstrate the difficulties which we have previously mentioned. In some cases the radiological examination was incomplete. This was often due to the patient being unable to stand during the examination. Malpresentation was sometimes found and in such cases it was not possible to exclude the presence of placenta praevia. In these cases it was suggested that further films be taken when the condition of the patient improved or after correction of the malpresentation. If these further films had been taken they would probably have confirmed or excluded placenta praevia. In 2 cases uterine fibroids were later discovered and in another case hydramnios was present. One case was a transverse lie at 28 weeks. In the cases which were subsequently "confirmed" it was noted that there had been no radiological doubt in making the diagnosis.

It was noted that during the years under review a number of cases of placenta praevia had been X-rayed in the antenatal period for

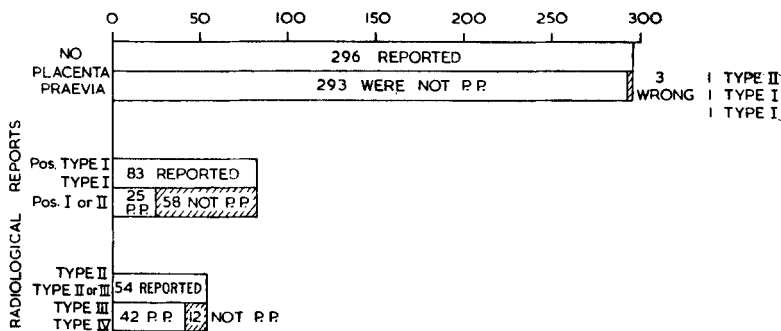


FIG. 4

A clinical follow-up of 433 cases X-rayed for placental site.

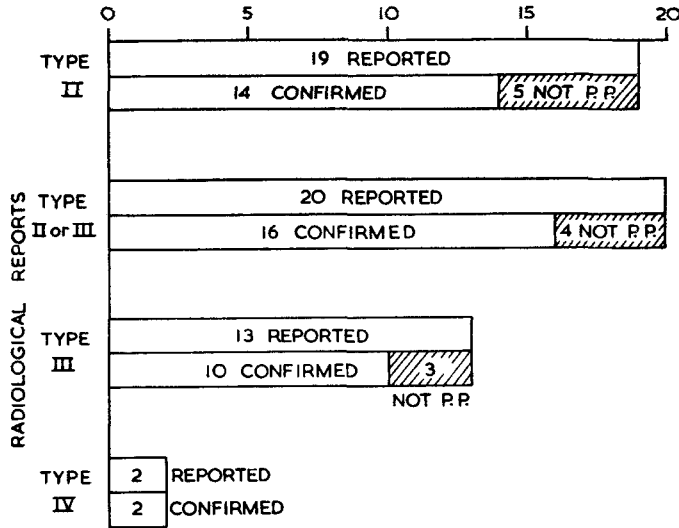


FIG. 5

Clinical follow-up of 54 cases reported Type II, III or IV placenta praevia.

indications other than ante-partum haemorrhage such as maturity, presentation, multiplicity or pelvimetry. It is of interest to record in how many of these cases the abnormal placental

situation had been observed in the radiological examination. From Figure 6 it will be seen that in 1950 there were 9 such cases of placenta praevia and in none of these had the possibility of placenta praevia been reported radiologically. After 1950 the reporting of the apparent placental site in routine radiological examinations was introduced and, as a result, 11 cases of unsuspected placenta praevia were noted. In 1953-1954 5 cases, 3 Type I and 2 Type II posterior, were "missed", possibly through an endeavour to reduce the number of cases incorrectly reported Type I. Figure 6 shows the value of noting the placental site in all routine radiological examinations during the antenatal period and determining the site if placenta praevia is suspected.

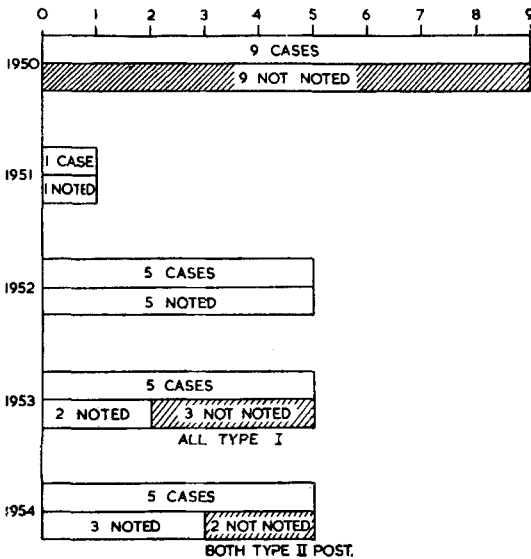


FIG. 6

Cases of placenta praevia discovered on review to have been X-rayed antenatally for reasons other than ante-partum haemorrhage.

THE VALUE OF RADIOLOGY IN PLACENTA PRAEVIA

Radiology is of undoubted importance in excluding placenta praevia, in that many patients who would otherwise be kept in hospital under expectant treatment for a long period, may be allowed to return to their families. This is not only of value socially but saves considerable expense to the hospital service.

The value of establishing the presence of placenta praevia is more difficult to assess as

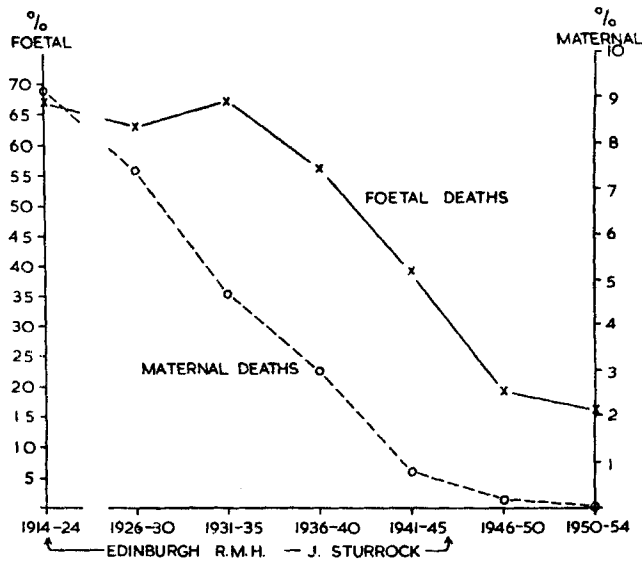


FIG. 7

Maternal and foetal mortality in placenta praevia (S.M.M.P.).

marked improvement in the prognosis for both mother and child had already occurred before the widespread use of X-ray examinations (Fig. 7). Many factors, including better obstetric care, influenced to some extent by radiological examination, improved anaesthesia and blood transfusion have led to a drop in maternal mortality almost to zero and a lowering of the foetal mortality rate to about 15 per cent. However, there may yet be a further reduction in foetal mortality when more widespread use of radiology to define the exact placental site can influence the treatment to be carried out in an individual case (Russell and Warrick, 1955).

SUMMARY

(1) The increased utilization of radiology in the diagnosis of placenta praevia is shown.

(2) Placenta praevia can be diagnosed with accuracy at an estimated duration of pregnancy of 32 weeks or over.

(3) The radiological technique is possible in any general X-ray department and the difficulties associated with interpretation are stated.

(4) The results of a review and follow-up covering a 4-year period are given. These show:
(a) Nearly 100 per cent accuracy in excluding placenta praevia.

(b) A high degree of accuracy in diagnosing uncomplicated Types II, III or IV placenta praevia.

(c) In Type I placenta praevia or in the presence of malpresentation, hydramnios, a small or deformed foetus, fibroid, etc., radiological findings may be uncertain.

(5) The value of looking for the placental site on all routine radiological examinations in obstetrics is emphasized.

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