produced, was thought at first to be due to infective hepatitis. The correct diagnosis became apparent when, on the eighth day after birth, it was learnt that the mother, an Englishwoman, had come home during her pregnancy from Lagos, Nigeria.

It is considered that aureomycin, given before the case was correctly diagnosed, kept the infant alive until more active antimalarial treatment could be adopted.

Mepacrine was given only a short trial, to be followed by pyrimethamine, which proved successful and non-toxic in the dose given. It is possible, but unproved, that 50 days later there was a malarial relapse.

The antimalarial actions of aureomycin and pyrimethamine as curative agents are briefly discussed.

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THE VALUE OF RADIOLOGY IN ANTE-PARTUM HAEMORRHAGE

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Location of the placental site by plain radiography was first described by Snow and Powell (1934), and later amplified by Dippel and Brown (1940) and Bishop (1945) in the U.S.A.; but the method had not had an adequate trial in Great Britain until Reid (1949) and Stallworthy (1951) gave an account of how radiological location of the placenta had been applied to the management of ante-partum haemorrhage.

This paper describes the results obtained in the use of radiography in determining the placental site in cases of ante-partum haemorrhage admitted to the Royal Hampshire County Hospital during 1951–3, and how these results have been applied.

Radiological Technique

The radiological technique follows closely that described by Reid (1949) and Whitehead (1953a); but special filters have not been used and the radiographs were taken on

standard equipment supplied to all x-ray departments in general hospitals.

When it is decided that the patient is fit for the examination, she empties her bladder and rectum in the ward, and the following views are taken in the x-ray department: (1) lateral views of the abdomen in the recumbent position: one penetrated film for the posterior half of the abdomen, and a "soft" film for the anterior half; (2) a lateral view of the pelvis in the erect or semi-erect position. In a large proportion of cases these two views are sufficient to demonstrate the placental site, since it is usually on the anterior or posterior wall; but when the placenta is entirely or mainly on the lateral wall two additional views are required: (3) antero-posterior or postero-anterior films of the abdomen in the erect position; and (4) oblique films of the abdomen in the recumbent position.

Interpretation of the Radiographs

(a) *Normal Implantation of Placenta.*—A placenta implanted in the upper uterine segment can be seen in the lateral radiographs of the abdomen by tracing the uterine and foetal outlines, and noting where an apparent thickening occurs between the two outlines. This "placental shadow" varies in thickness between 3.1 and 5.8 cm.—the remainder of the uterine wall shadow being between 0.5 and 1.3 cm. (Whitehead, 1953a)—and can be seen with definition after the thirty-second week of pregnancy, when subcutaneous fat is deposited in the foetus. There is no constant relation between the dorsal and ventral aspects of the foetus and the placenta. If the placenta cannot be seen on the anterior or posterior wall or fundus, then it is either in the pelvis (placenta praevia) or implanted on the lateral uterine wall, in which case the oblique and postero-anterior views will be required. Normal implantation on the lateral wall is rare, and no such case has occurred in this series. When the placenta is calcified and normally implanted on the anterior wall its outline can be accurately demonstrated (Dawson, 1953).

(b) *Placenta Praevia.*—If there is placenta praevia, either the "placental shadow" cannot be seen in the upper uterine segment on the lateral and oblique radiographs of the abdomen or, more usually, the "placental shadow" disappears into the pelvis and there is an associated displacement of the foetal skull or other presenting part to be seen in the erect lateral film of the pelvis. The presenting part usually fits symmetrically into the pelvic brim when the placenta is normally implanted, and is displaced by a low-lying placenta. But displacement of the presenting part alone is inadequate for the diagnosis of placenta praevia, since this may be due to many other causes—for example, full bladder and rectum (these should have been excluded before the x-ray examination), pelvic tumour, disproportion, short umbilical cord. It is therefore necessary to correlate the "placental shadow" seen in the recumbent lateral films of the abdomen with the displacement of the presenting part seen in the erect film of the pelvis.

Interpretation of the radiographs tends to be difficult and less certain in the following circumstances:

Before the Thirty-second Week of Pregnancy.—In a premature foetus before the thirty-second week, the subcutaneous fat is insufficient to reveal its outline, and the foetal skull is small in relation to the pelvic brim. Ante-partum haemorrhage is rarely serious before the thirty-second week, and in most patients it is possible to repeat the examination at the thirty-fourth or thirty-sixth week, when a more definite opinion can be given.

Abnormal Presentations.—These are a common complication of ante-partum haemorrhage and placenta praevia in particular. In this series there were 4 abnormal presentations in 20 cases of placenta praevia, and 3 abnormal lies in 24 cases of ante-partum haemorrhage with a normally implanted placenta. If possible, the examination should be repeated after version.

Hydramnios and Multiple Pregnancy.—These are infrequent complications of ante-partum haemorrhage, and the problem has not occurred in this series.

After viewing the radiographs one of the following reports is submitted: (1) "The placenta is situated in the upper uterine segment on the anterior or posterior wall or fundus." (2) "There is a placenta praevia situated on the anterior or posterior wall." (3) "There are radiological signs that the placenta is implanted low on the uterine wall, and it may be a placenta praevia."

If there is doubt regarding a normal implantation of the placenta the case must be reported as one of potential placenta praevia and the patient must remain in hospital.

Obstetric Management

On admission, prior to which no vaginal examination should be made, the blood group of the patient is ascertained, and a haemoglobin estimation made, followed by transfusion if necessary. Whether or not each case requires radiological investigation will depend on the clinical findings, and it is thought to be unnecessary in cases of obvious accidental haemorrhage. Where the bleeding may be due to a possible placenta praevia an x-ray examination is carried out.

Where possible, it has been the practice to avoid vaginal examination until after the thirty-eighth week of pregnancy. Such examination should be conducted in the operating theatre under anaesthesia, arrangements being made for immediate section should this be required.

Prior to the introduction of location of the placenta by radiography, patients admitted some weeks before term with a possible diagnosis of placenta praevia had to remain in hospital under supervision until the diagnosis could be confirmed or disproved by vaginal examination. In this hospital, after a three-year trial period, a patient whose placenta has been radiologically confirmed to be normally implanted is discharged from hospital one week after the cessation of haemorrhage, provided her general condition is satisfactory. A gentle speculum examination is made in the theatre rather than the ward one week after haemorrhage has stopped, to exclude bleeding from an extraplacental site—for example, a polyp or carcinoma of the cervix. Cases in which there is any doubt regarding the placental site are retained in hospital.

Results

The cases of ante-partum haemorrhage admitted during 1951–3 are analysed in Table I.

TABLE I.—*Cases of Ante-partum Haemorrhage Admitted 1951–3*

Placenta praevia	33
Accidental haemorrhage	31
Local external causes	4
Undiagnosed	43
	<hr/> 111

TABLE II.—*X-ray Examinations for Location of Placenta in Ante-partum Haemorrhage*

Diagnosis		Confirmation	
Placenta praevia	20*	Caesarean section	14
		Vaginal examination	5
Normal implantation	24	Necropsy	1
Final report doubtful	3	Normal deliveries	24
		Placenta praevia	3
	<hr/> 47		

* Including 4 cases diagnosed before haemorrhage occurred.

All radiological diagnoses of placenta praevia were confirmed (Table II), and some of these cases were submitted to caesarean section without a preliminary vaginal examination in order to shorten the time that the mother and foetus were under the anaesthetic before delivery. There was direct confirmation in only one of the cases diagnosed as a normal implantation in which the placenta was manually removed; but in no case was there any indirect evidence to the contrary. Normal implantation of the placenta has been

reported in numerous other cases, not included in this series, without contradiction. The three doubtful reports were made in cases in which the foetal head appeared to be engaged in the pelvic brim; but in each case a vaginal examination discovered a Degree I or II placenta praevia, for which vaginal delivery was allowed, with successful results.

From Table III it is obvious that half the cases, and nearly all those not submitted to x-ray examination, were admitted in labour, with vaginal delivery during the next 36 hours.

TABLE III.—*Cases of Ante-partum Haemorrhage not X-rayed*

Vaginal delivery shortly after admission (placenta praevia, 7; accidental, 12; undiagnosed, 34)	53
Emergency caesarean section (placenta praevia)	3
Severe accidental haemorrhage	4
Local external causes	4
	<hr/> 64

Conclusions

The results obtained in locating the placental site by plain radiography prove that the technique is reliable enough to justify its adoption as a routine procedure in general hospitals, and this assertion is supported by the findings of other investigators (Reid, 1953; Whitehead, 1953b).

The use of contrast media is regarded as unjustifiable in the investigation of ante-partum haemorrhage at this hospital, and to have no advantages over plain radiography combined with clinical examinations. Amniography has too many risks; cystography is unreliable, especially if the placenta is posterior; aortography (Hartnett, 1948) and retrograde femoral arteriography (Sutton, 1952) are too drastic for routine purposes.

Plain radiography cannot displace vaginal examinations entirely, and the two examinations are complementary, since by the former one is unable to assess the degree of placenta praevia. In selected cases the radiological diagnosis of a placenta praevia has justified caesarean section without preliminary vaginal examination.

Patients who have no obstetric abnormality and are definitely reported to have a normal placenta may be discharged for home confinement, thus saving hospital beds.

The fact that radiography will confirm a clinical suggestion of placenta praevia should prove a further stimulus to obstetricians to discover this abnormality before bleeding occurs.

Summary

The technique of placental location by plain radiography at the Royal Hampshire County Hospital during 1951–3 is described and the results are analysed.

The method is considered to be reliable, and it is concluded that: (a) all cases of ante-partum haemorrhage, excluding obvious accidental haemorrhage with severe toxæmia, should be x-rayed before vaginal examinations are performed; and (b) if a normally implanted placenta can be diagnosed without doubt radiologically, and there are no other complications, then the patient may be discharged.

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