

# Women with bleeding in the first 20 weeks of pregnancy: value of general practice ultrasound in detecting fetal heart movement

CHRISTOPHER B EVERETT

ELIZABETH PREECE

## SUMMARY

**Background.** Real-time ultrasound scanning has made it possible to ascertain whether the fetus is alive in women who have bleeding in early pregnancy. Portable ultrasound machines are capable of detecting fetal heart movement reliably after the ninth week of pregnancy, and can be used in a general practice setting. An ultrasound clinic was set up in a health centre and 22 general practitioners in the local area could refer women patients with bleeding in early pregnancy.

**Aim.** A study was carried out among women with bleeding in early pregnancy to compare the presence of fetal heart movement detected at the initial ultrasound scan with subsequent fetal survival during the first 20 weeks of pregnancy.

**Method.** Data were collected during a three-year period on women referred opportunistically by their general practitioners. An abdominal scan was performed on the same day or the day after presentation and the presence or absence of fetal heart movement recorded. Diagnoses and outcome at 20 weeks were ascertained from patients' health centre records.

**Results.** A total of 240 women with bleeding in early pregnancy were scanned and at the first examination fetal heart movement was detected in 115 of the fetuses (48%). Three fetuses were subsequently miscarried spontaneously while 109 of the 115 continued to the 20th week (95%). Three fetuses had gross abnormalities and these pregnancies were subsequently terminated. No heart movement was detected in 117 fetuses (49%); all were subsequently miscarried. For eight women scanned it was not clear whether fetal heart movement was present. Three of these eight pregnancies survived to the 20th week. Predictive values of fetal survival to the 20th week of pregnancy from fetal heart movement detected by general practice ultrasound scan for women with bleeding in early pregnancy showed a sensitivity of 97% and a specificity of 98%.

**Conclusion.** If fetal heart movement is detected at the initial scan, approximately 19 out of every 20 viable pregnancies (those in which the fetus appears normal) will not miscarry before the 20th week. Using ultrasound in general practice it was possible to identify promptly those women with bleeding whose fetus was alive. For those women found to have a non-viable pregnancy, appropriate arrangements could be made at an early stage in the knowledge that a miscarriage was inevitable, thus avoiding unnecessary bed rest for the patient. Where fetal heart movement was detected, there was a good prognosis and thus women could be given strong reassurance.

**Keywords:** bleeding in pregnancy; fetal heart rate; spontaneous abortion; ultrasonic radiography; general practitioner clinics.

## Introduction

**B**LEEDING (suspected miscarriage) is a complication that affects about 30% of early pregnancies<sup>1</sup> and is followed by a miscarriage in about 15% of all recognized pregnancies.<sup>2</sup>

In early pregnancy the introduction of real-time ultrasound scanning to detect fetal heart movement has begun to replace the hand-held Doppler machine which, even when used by experts, only detects fetal heart movement in 73% of viable pregnancies in the 10th week.<sup>3</sup> Real-time ultrasound improves on the Doppler machine as it can often detect fetal heart movement by the sixth week of pregnancy and is reliable after the ninth week.<sup>4</sup> The value of using ultrasound in the presence of bleeding was first reported by Robinson in 1975.<sup>4</sup> For the next 10 years the size and expense of ultrasound machines limited the performance of this investigation to hospitals, where studies showed that if fetal heart movement was detected after the onset of bleeding in early pregnancy the survival rate varied from 87%<sup>1,5</sup> to 97%.<sup>6</sup>

A survey of 1290 general practitioners in Wessex in 1986 indicated that, although 81% of them wished to use hospital ultrasound, many met with difficulty as their local hospitals did not have open access.<sup>7</sup> Portable machines became available to the general practice profession shortly after the survey, which meant that for the first time it was possible to provide a diagnostic service in general practice for women with a suspected miscarriage.

No reports on the use of ultrasound scanning in general practice for bleeding in early pregnancy could be found in a literature search. An ultrasound clinic was set up in a health centre in Alton, Hampshire and a three-year study was carried out among women with bleeding in early pregnancy to compare the presence of fetal heart movement at the patient's initial scan with subsequent fetal survival during the first 20 weeks of pregnancy.

## Method

### Patient sample

Women with bleeding in the first 20 weeks of pregnancy were referred to the health centre ultrasound clinic by 12 general practitioners in Alton (combined list size 21 400; 5140 women aged 15–44 years) and by 10 practitioners in Bordon five miles away (combined list size 19 300; 4190 women aged 15–44 years).

### Ultrasound clinic

The ultrasound equipment used was a 3.5 k linear abdominal scanner (Pie Medical, model 400) which had been donated to the health centre. A model 150 sector scanner was used in the third year of the study. An Amstrad PCW 8256 with *Locofile* was used to record and analyse initial findings. Most of the referred women were examined by a senior midwife (E P) who held three clinics per week, or otherwise by a general practitioner (C E). Both professionals had received ultrasound training at the local Basingstoke General Hospital. Scans were performed on the

C B Everett, MBBS, DCH, DObstRCOG, general practitioner and E Preece, BA, RM, ADM, DPSM, senior midwife and ultrasonographer, Alton, Hampshire. Submitted: 18 January 1995; accepted: 15 May 1995.

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same day or the day after presentation. Where no fetal heart movement could be detected or where a scan was unclear, women were referred to the local hospital, except for women whose pregnancies were between six and nine weeks; these women had another scan at the health centre within a week.

The clinic was set up in 1986 and data for the study were collected for the first three years of the clinic. Data were recorded for the initial scan, the diagnoses of unviable pregnancies and the outcome of viable pregnancies at 20 weeks. The outcome of each pregnancy at 20 weeks was ascertained from the patient's health centre records. Those women who bled before having an elective termination are not included in this study.

## Results

A total of 237 women with bleeding in early pregnancy attended the health centre ultrasound clinic during the three-year study period and three women were scanned at their home. Fetal heart movement was detected in 115 (47.9%) of the 240 women. In 112 of these women the fetus appeared normal; three of these 112 fetuses were subsequently miscarried spontaneously while the other 109 survived to the 20th week. Three fetuses in which fetal heart movement was detected had gross abnormalities (two had spina bifida and one had large abdominal cysts); these pregnancies were terminated in hospital.

No fetal heart movement was detected in 117 of the 240 women (48.8%) and all were subsequently miscarried. The diagnoses relating to these pregnancies are shown in Table 1. The fetus appeared normal for the gestational age in 15 of this group (12.8%). Approximately a quarter (26.5%) had gestational sacs greater than 2.5 cm in diameter with no fetus (blighted ovum<sup>8</sup>). Six women had a molar pregnancy. Fifteen of the 117 women in whom no fetal heart movement was detected were more than nine weeks pregnant. They were referred to hospital for a second opinion; no fetus was subsequently found to be alive.

For eight of the 240 women scanned (3.3%) it was not clear whether fetal heart movement was present; these eight women were all less than nine weeks pregnant. Two were referred to hospital for a second opinion; the other six were scanned a week later in the health centre. Three of these eight pregnancies survived to the 20th week.

The predictive results of fetal survival to the 20th week of pregnancy from fetal heart movement detected by general practice ultrasound scan for women with bleeding in early pregnancy are shown in Table 2: sensitivity was 97.3% and specificity was 97.7%.

## Discussion

Confirming the viability of a pregnancy is essential for general practitioners in the management of women with bleeding in early

**Table 1.** Diagnoses relating to 117 pregnancies in which fetal heart movement was not detected at initial scan for women attending general practice ultrasound scan for bleeding in early pregnancy.

	No. (%) of pregnancies with diagnosis
Normal fetus	15 (12.8)
Abnormal fetus (shadow)	48 (41.0)
Anembryonic sac	31 (26.5)
No gestational sac	15 (12.8)
Molar pregnancy	6 (5.1)
Ectopic pregnancy/no pregnancy	2 (1.7)

**Table 2.** Predictive results of fetal survival to the 20th week of pregnancy from fetal heart movement detected by general practice ultrasound scan for women with bleeding in early pregnancy.

Fetal heart movement on ultrasound	No. (%) of fetuses with outcome at 20th week		
	Survived	Miscarried	Total
Present (no abnormality)	109 (97.3) <sup>a</sup>	3 (2.7)	112 (100)
Absent/unclear/ gross abnormality	3 (2.4) <sup>b</sup>	125 (97.7) <sup>c</sup>	128 (100)
Total	112 (100)	128 (100)	240 (100)

<sup>a</sup>sensitivity: true positives ÷ (true positives + false negatives). <sup>b</sup>Ultrasound scan at less than nine weeks gestation. <sup>c</sup>Specificity: true negatives ÷ (false positives + true negatives).

pregnancy. It is not possible to ascertain viability by clinical examination and the development of ultrasound scanners has made diagnosis possible. Before their development, bed rest was frequently advised for women with viable and non-viable pregnancies without discrimination.

The availability of ultrasound in general practice has made the diagnosis and management of such cases easier because the viability of the pregnancy can now be reliably established after the ninth week<sup>4-6</sup> and the patient told if the fetus is alive: if it is not, then appropriate arrangements can be made at an early stage in the knowledge that a miscarriage is inevitable. In the present study, the management of the inevitable miscarriages depended on the wishes of the woman concerned. Many women were given the option of delaying their hospital admission to the following day, some of whom miscarried at home without being admitted to hospital.

Initially there had been concern among general practitioners that, of the living fetuses revealed by a prompt ultrasound scan in general practice, a high proportion would subsequently be miscarried. This proved not to be the case, as the loss of live fetuses by the 20th week after a positive initial scan in which no abnormality was seen was only 3%. This was the same proportion reported in Stabile and colleagues' hospital-based study published one year after the clinic started.<sup>9</sup> With such a good prognosis in cases where fetal heart movement is detected despite bleeding being present, it is possible to give the patient strong reassurance and avoid the usual referral to hospital, so saving a journey and the cost of a hospital ultrasound scan.

Fifteen women who were more than nine weeks pregnant had no fetal heart movement detected. These women were referred to hospital for a second opinion; no fetus was subsequently found to be alive. It is important that the definitive diagnosis of fetal death is made by an expert in ultrasound rather than by the general practitioner (as discussed in the 1994 South Glamorgan Health Authority independent inquiry into obstetric ultrasound). If a woman miscarries before she reaches hospital, then fetal death must have occurred. If no gestational sac is visible then an ectopic pregnancy must be excluded by referral to hospital.

There used to be no guidelines in clinical practice on how to differentiate complete from incomplete miscarriages when a known intrauterine pregnancy subsequently disappeared. In 1991 Kurtz and colleagues reported that an abdominal ultrasound scanning probe was as reliable as a vaginal ultrasound probe in the detection of retained products of conception (endometrium is thicker than 5 mm).<sup>10</sup> Management options were clarified by Mansur in 1992<sup>11</sup> who reported that in women with clinical signs

of an incomplete abortion, if the endometrium resembles two parallel curvilinear lines on ultrasound, these women could be treated conservatively (predictive value of 98% for those not needing dilatation and curettage).

In the present study there were six women with a molar pregnancy, representing 3% of all the women scanned, which compares with 6% reported by Robinson<sup>12</sup> and 3% reported by Stabile and colleagues.<sup>9</sup> All were referred for specialist follow up.

It is estimated from an unpublished cohort study in 1989–90 (by C E) that general practitioners in Alton referred for general practice ultrasound approximately three quarters of all women who experienced bleeding in early pregnancy. The remaining women had only slight bleeding and were not referred or were admitted to hospital with a clinical diagnosis of miscarriage. During the first year of the clinic three ultrasound scans were performed at the patient's home, but it was found that the machine tended to work erratically if moved about. Surveillance of women in this study ceased at the 20th week of pregnancy so the number of live births was not investigated; however in the unpublished study by C E it was found that of 448 women who were pregnant at 20 weeks, there were eight subsequent still births/neonatal deaths. In only one of these cases had the woman had bleeding before the 20th week.

Access to the health centre ultrasound clinic meant that women avoided the 15-mile journey to the nearest maternity ultrasound department at Basingstoke District General Hospital. Since the study was completed, three other local general practitioners have learnt how to use the scanner and have found the experience of identifying a live fetus rewarding. District midwives have also appreciated the availability of a local facility to establish promptly the presence or absence of fetal heart movement in women with bleeding in early pregnancy. In the clinic's third year money was raised to buy a sector scanner (Pie Medical, model 150); the ease of identification of fetal heart movement was not considerably different from the linear machine.

A Scottish report published in 1988 suggested that the provision of a first-line ultrasound scanning service could reduce the number of hospital admissions of women with bleeding in early pregnancy.<sup>13</sup> To achieve this, all general practitioners would need to have prompt access to an appropriate ultrasound service for all those women who present with bleeding in early pregnancy. Repeat scans should be performed at two-week intervals to monitor progress. In urban areas open access to hospital or an early pregnancy assessment unit<sup>14</sup> may be appropriate. In rural areas, and for practices with a special interest in ultrasound, practices could run their own ultrasound clinic which, in view of capital and training costs, might be most appropriate for fundholding practices.

In 1993 the Royal College of Radiologists and Royal College of General Practitioners made recommendations about the training of general practitioners wishing to use ultrasound.<sup>15</sup> Earlier, a Royal College of Obstetricians and Gynaecologists report on the use of ultrasound in pregnancy had also discussed training, and proposed that unsupervised antenatal scanning should be done only by those professionals holding a diploma in obstetrical ultrasound.<sup>16</sup> Whether the simple identification of fetal heart movement should be included in the recommendation is not clear. It could be argued that a general practitioner or midwife can be taught to identify fetal heart movement without undertaking a diploma.

The use of ultrasound in general practice enables general practitioners and midwives to reassure many women who have bleeding in early pregnancy, since these women have a good prognosis if fetal heart movement is detected and the fetus appears normal: approximately 19 in 20 women with a viable pregnancy will not have a miscarriage before the 20th week.

Further studies are needed to compare the different ways of delivering a prompt diagnostic ultrasound service for all women with bleeding in early pregnancy, and to assess the best way to manage these women in hospital and in general practice.

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## Address for correspondence

Dr C B Everett, Alton Health Centre, Alton, Hampshire GU34 2QX.

## Food for thought...

*'That recommendation from a friend was as powerful a predictor of consultation rate as the effect of having a long-term pre-child relationship with the doctor suggests that it is not the length of the doctor-patient relationship that is the important factor but the perceived sympathy of the doctor. It also seemed that starting a family was a point at which mothers felt able to change their doctor with apparent legitimacy, an otherwise difficult act. To continue to consult the doctor they had seen before the child's birth was an expression of confidence in that doctor.'*

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