She made an uneventful postoperative recovery, and when seen in the outpatient department four months later was well and menstruation had returned to normal.

Histology.—By comparison with placentae belonging to embryos of known size the histology corresponds most closely to those of 10 to 15-mm. (37 to 42-day) embryos as regards the characteristics of the cytotrophoblast and syncytiotrophoblast and the disposition of the stromal cells.

DISCUSSION

Studdiford's (1942) three criteria for a primary peritoneal pregnancy are as follows: (1) both tubes and ovaries must be normal, with no evidence of recent and remote injury, (2) there must be no evidence of uteroperitoneal fistula, and (3) the pregnancy must be related exclusively to the peritoneal surface and young enough to eliminate the possibility of secondary implantation following a primary nidation in the tube.

Millar (1961) pointed out that the earlier the pregnancy can be detected the more convincing will be the evidence of primary peritoneal implantation, and recorded the youngest reported case, that of a 23–24-day pregnancy. The present case fulfils the three criteria, and it is significant that the implantation site was well away from the tubes and ovaries.

Cavanagh (1958) suggested that the majority of peritoneal pregnancies are secondary, the ovum escaping from the tube and becoming attached to the omentum. It is then transferred to part of the peritoneal surface, where it is finally implanted. If this is so the omentum should be found adherent near the implantation site, which it was not in this case.

Iffy (1961), after analysing the timing of a series of accurately dated cases of ectopic pregnancy, concluded that conception occurred just before the last period. He stressed that they were derived from the ovulation before, not after, the last normal period and suggested that the menstrual bleeding itself was

responsible for displacement of the ovum by producing blood in the tubes.

In the present case, however, the dating is more suggestive of conception from a normal ovulation about two weeks before the last period. Though it is certain that the peritoneal implantation was not secondary to tubal rupture, it is possible that a loose initial attachment was formed in the tube and the embryo later extruded from the ostium by retrograde menstrual flow. It is equally possible that the ovum was fertilized outside the tube and descended into the pouch of Douglas. Whichever occurred, the first effective implantation was on the peritoneum and was sufficiently well established to produce 3 pints (1.7 l.) of blood on rupture.

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A. G. JOHNSON, F.R.C.S.,
Honorary Lecturer, Professorial Surgical Unit,
Charing Cross Hospital, London W.C.2.

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Iliac Haematoma Syndrome as a Complication of Anticoagulant Therapy

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Intramuscular haematomas in patients receiving anticoagulant drugs rarely cause peripheral nerve damage. Two cases of femoral nerve palsy admitted to hospital after the onset of paralysis were described by Lange (1966). Below is a report of a similar case which occurred while the patient was in hospital and the entire course of the syndrome was observed.

CASE HISTORY

A man aged 68 was admitted to hospital on 22 November 1962 for treatment of a deep vein thrombosis of the right leg. During the previous month he had been treated at home with tetracycline for an exacerbation of his bronchitis. The right leg was oedematous but the left was normal, with full, active movements at the hip, knee, and ankle. Blood pressure was 225/125 and haemoglobin 89%. The white cell count, erythrocyte sedimentation rate, plasma proteins, electrolytes, and blood urea were normal. Anticoagulant treatment with phenindione was begun that day, together with chlorothiazide.

On the fifth day his right leg had greatly improved and mobilization was begun. He moved himself into a sitting position on the edge of his bed and felt a sudden severe pain in the left inguinal region. As this worsened he found that the anterior and medial sides of the left thigh and the medial side of the lower leg were

numb. When examined shortly afterwards he lay with his left hip in 90 degrees of flexion and slight abduction and external rotation. Tenderness, guarding, and fullness were present in the left iliac fossa. There was sensory loss in the area of distribution of the

FIG. 1

FIG. 2

FIGS. 1 and 2.—Area of initial sensory loss is shown by a solid line and area a week later by an interrupted one.

femoral nerve. The left patella tendon reflex was absent. The left quadriceps muscle had a strength of 1 (Medical Research Council rating). The "prothrombin activity" was 15% measured by the Owren prothrombin-proconvertin (P. and P.) method (therapeutic range 10–20%). The severe pain was controlled by immobilization in bed and by injections of pethidine.

He received two more doses of phenindione before it was stopped on the following day, when the prothrombin activity was 14%. On the third day a neutrophil leucocytosis was found, with a total white count of 15,000/cu. mm. Platelets numbered 257,000/cu. mm. and the E.S.R. was 42 mm. in one hour. The pain was much less severe and it was possible to outline the area of sensory loss more accurately. It involved the anterior surface of the thigh from below the femoral triangle to the tibial tubercle, with a large part of the medial and lateral surfaces, and extended in a strip to the medial malleolus. The area of sensory loss is shown in Figs. 1 and 2.

The prothrombin activity returned to normal in seven days, the haemoglobin fell to 68%, and the blood urea rose from 33 to 50 mg./100 ml. The area of anaesthesia was diminishing, the pain had gone, but the weakness in the quadriceps was unchanged. A fixed flexion deformity of 10 degrees remained in the left hip joint. On 21 December he was able to walk, with the left knee supported by a plaster-of-Paris backslab. A month later the left quadriceps power was 3+, sensation had improved, but he still had a fixed flexion deformity of 10 degrees. In April 1963 a small area of anaesthesia persisted on the anterior thigh. There was no fixed flexion deformity of the hip, and quadriceps power was almost full.

DISCUSSION

The patient was admitted to a unit where the same syndrome in haemophilia and Christmas disease was being studied. The presentation, progress, and prognosis proved similar. The pain, the femoral nerve palsy, and the iliac fossa fullness were caused by haemorrhage into the iliacus muscle. The patient's posture and his subsequent fixed flexion deformity are found in haemophiliacs with this syndrome. The rapid fall in his haemoglobin concentration confirms a bleed.

Intramuscular haemorrhage is frequent in haemophilia and Christmas disease, and bleeding into the iliacus muscle with femoral nerve palsy is a common complication (Goodfellow and Fearn, 1965). The bleeding occurs primarily into the iliacus muscle, not the psoas. This has been shown by Goodfellow *et al.* (1967), who described the anatomy and the means of nerve compression. Bleeding in the muscle distends the iliopectineal compartment and compresses the femoral nerve against a thickening in the iliopectineal sheath. Brower and Wilde (1966) suggested that the bleeding originates at the musculotendinous junction to produce swelling in the femoral triangle as well as in the iliac fossa. In this case and in those reported by Goodfellow *et al.* (1967) no swelling was present in the femoral triangle and bleeding occurred in the iliacus muscle itself, above the inguinal ligament. When psoas is involved a separate fusiform swelling, medial to the iliacus swelling, is palpable in the abdomen.

The neurological deficit may be difficult to detect, for severe pain prevents effective examination. For this reason acute suppurative arthritis or haemarthrosis of the hip joint may be suspected. The tenderness, guarding, and fullness in the iliac fossa will exclude these but introduce the possibility of appendicitis, local peritonitis, or rectus abdominis muscle haematoma. Epidural haemorrhage causes paralysis but is not accompanied by fixed hip flexion or by an abdominal mass.

Intramuscular haemorrhage in patients on anticoagulants is quite common; Klingensmith and Oles (1964) place it fifth in frequency. A few cases of rectus abdominis haematoma have been reported (Axelrod and Kleinfeld, 1951). Pastor *et al.* (1962) reported haemorrhage into the thigh muscles and calf

in patients on unsupervised treatment, with no nerve involvement. Douglas (1962) mentioned bleeding into the iliopsoas, and Lange (1966) described two cases with femoral nerve involvement.

Several factors have been shown to influence the effect of anticoagulant drugs, and some of these were found in this case. Age has a definite effect. Pollard *et al.* (1962) found that the average age of patients with major bleeds was 66.7 years, and Douglas (1962) stated that bleeding is twice as common in patients aged 70–80 years as in those aged 30–40. The present patient was 68. He was also hypertensive, and Pollard *et al.* found hypertension to be more common among those who bled. The prothrombin activity was within the therapeutic range, as were 69% of the bleeds that occurred in the patients of Pollard *et al.*

Less definite factors in this case were the recent intercurrent disease of acute-on-chronic bronchitis and its treatment by a broad-spectrum antibiotic which may have reduced his vitamin K uptake. One of the cases described by Lange (1966) bled after taking a course of tetracycline for a productive cough.

The precipitating factor is difficult to explain. The patient was performing an unpractised movement. Perhaps he ruptured some small blood vessels. The onset of symptoms was rapid, so the bleeding must have been rapid. It has been suggested that capillary health depends on a normal coagulation mechanism (Spaet, 1952).

Treatment.—Once the coagulability of this patient's blood had returned to normal there was no danger of further bleeding, so progress was swifter and treatment was simpler than in haemophiliacs. The phenindione was not reversed by injection of vitamin K₁, though this can be done. The anticoagulant drug must be stopped. Immobilization of the affected leg by pillows relieves much of the pain in the initial stages. The haematoma is soon reabsorbed and active movements are encouraged as early as possible to overcome the fixed flexion deformity of the hip joint. The affected knee joint is splinted to allow walking, though it must be put through a full range of movement daily and the patient should be encouraged to contract the weakened quadriceps. Full recovery of the femoral nerve and quadriceps function can be expected after early treatment.

In haemophilia recovery is slower and nerve damage is more severe.

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C. B. D'A. FEARN, M.A., F.R.C.S., F.R.C.S.ED.,
Accident Service, Radcliffe Infirmary, Oxford.

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