of 120 mg. During the operation spontaneous respiration was detected and 5 mg. of tubarine was given intravenously. Ergometrine 0.5 mg. was injected intravenously immediately after delivery of the infant; at this stage of the operation a haemorrhage of 2 pints (1,140 ml.) occurred, the patient's pulse rate rose from 90 to 140 a minute, and the pulse was of poor volume. An intravenous drip of dextran in 5% glucose was started, and 20 minutes later, when the operation was complete, 750 ml. of this solution had been given.

When the caesarean section was finished the pulse rate was 140 and of good volume, although there was no sign of the spontaneous onset of respiration or the return of consciousness. A severe oedema of the conjunctivae was noted; the blood-pressure was 210/130, and the pulse rate 200; the skin was flushed and the muscle tone flaccid. A gas mixture containing 5% CO₂ was used for five minutes, nikethamide 1 ml. was injected intravenously, and 15 minutes later 1/100 gr. (0.65 mg.) of atropine followed by two injections of 1.25 mg. of neostigmine was given intravenously. The patient remained apnoeic and unconscious, and her muscles were still flaccid. A catheter specimen of urine showed a heavy cloud of protein and a trace of glucose.

One and a half hours after the operation there was some movement of the patient's trunk although no respiratory movement had yet occurred. Ten mg. of pentolinium tartrate was injected intravenously and the blood-pressure fell from 300 to 130 systolic but soon rose again to 190. At this stage the differential diagnosis appeared to be (a) severe pre-eclampsia, (b) phaeochromocytoma of the adrenal gland, (c) an abnormal reaction to dextran or scoline, and (d) a cerebrovascular accident associated with the severe hypertension. The apnoea could have resulted from the scoline or from a cerebral haemorrhage. Lumbar puncture was performed and a clear C.S.F. obtained at a pressure greater than 300 mm. H₂O.

Four hours after the operation spontaneous respiration began gradually, the conjunctival oedema diminished, and the patient became conscious. The pulse rate was 100 and the systolic blood-pressure 130. Seven hours after operation the patient felt perfectly well, the blood-pressure was 100/80, the conjunctival oedema had disappeared, and the optic fundi were normal. Examination of the central nervous system showed no abnormality. The urine appeared cloudy and microscopical examination revealed a large number of hyaline and cellular casts, red blood cells, and a few pus cells; protein was estimated as 131 mg./100 ml. Eleven hours after operation the patient had no symptoms, the pulse rate was 90, the blood-pressure 100/80, no oedema was present, and the urine was free of protein. Convalescence was uneventful.

Other investigations included: Blood urea, 33 mg./100 ml., 25 mg./100 ml. Serum electrolytes, sodium 14 and potassium 4.2 mEq/l. Repeat urine examination: occasional epithelial cells, no protein, no glucose. Throat swab: normal flora. Liver-function tests: within normal limits. Hb, 9.8 g./100 ml. Leucocytes, 11,000/c.mm. (neutrophils, 80%, lymphocytes, 14%, monocytes 6%). Film: some anisocytosis, poikilocytosis, and polychromasia. Chest x-ray picture normal. Intravenous pyelogram (3 months after delivery): normal. no soft-tissue mass in either suprarenal area. Urinary catechol amines within normal limits. Serum pseudo-cholinesterase, 11 units/100 ml. (normal 60-120).

COMMENT

The association of a low serum pseudocholinesterase with apnoea after the use of scoline supported the diagnosis of a scoline-induced apnoea. Later the patient's sister was discovered to have had a similar episode of apnoea after the use of scoline during anaesthesia for external version during pregnancy; familial occurrence of a low serum pseudocholinesterase has been reported (Kaufman *et al.*, 1960).

While the protean manifestations of pre-eclamptic toxæmia are well known, the occurrence of gross conjunctival oedema within a period of five minutes, the unusual time of onset of the signs and their severity combined with their speed of onset and subsidence would be unusual in this disease. The use of dextran suggested the possibility of a reaction to this drug, but no report of hypertension after its use can be found in the literature. The administration of intravenous ergometrine was not thought to be a causative factor in this patient.

As the duration of the hypertension and conjunctival oedema corresponded to the period of respiratory apnoea the possibility that scoline caused these signs in the patient must be considered, although normally scoline is said to produce a mild hypotension.

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A Case of Silent Antepartum Rupture of the Uterus

Practitioners are well aware of the risk of uterine rupture associated with labour after previous caesarean section, in a multiparous patient with suspected disproportion, or with a malpresentation, and such patients are usually admitted to hospital for confinement.

The following case of silent rupture of the uterus at the 34th week presented an interesting clinical problem. The patient had had no previous operations nor a history of difficult labour.

Pathognomonic clinical signs or symptoms are not constantly present in any medical or surgical problem, but when elicited they go a long way towards establishing the diagnosis. Shoulder-tip pain is one such symptom. When associated with an abdominal complaint intraperitoneal bleeding is likely, but its absence by no means rules out this possibility. The persistence and severity of shoulder pain in the present case provided the clue to the likely diagnosis.

CASE REPORT

A married woman aged 37 was admitted to hospital on February 17, 1959, complaining of vaginal bleeding and abdominal pain. She was then 34 weeks pregnant in her fifth pregnancy. Her history had been good, she had had no previous illnesses or operations, and her four children had all been born spontaneously at 40 weeks without apparent difficulty. Her last child weighed 10 lb. (4,535 g.) at birth, and she stated that her recovery from the confinement was slow. For three or four days after the delivery she experienced lower abdominal pain, and pain in the shoulders, which disappeared spontaneously. The present pregnancy had been progressing normally until the day of admission to hospital, when she woke up with backache, lower abdominal pain, and vaginal bleeding. She was admitted to hospital with the provisional diagnosis of accidental haemorrhage.

On admission in the early afternoon her general condition was fairly satisfactory. The temperature was normal, pulse

88, and there was no urinary abnormality. Blood-pressure was 120/75 mm. Hg. She was not shocked and vaginal bleeding had ceased. The uterus was enlarged to the size of a 34-week pregnancy; it was soft in consistency and not tender. There was slight lower abdominal tenderness in the iliac fossae but no guarding or rebound pain. The foetus was lying transversely and the foetal heart was not heard. In the evening she complained of shoulder pain in addition to her abdominal discomfort, and the pulse had risen to 100 at one point but settled down quickly to normal.

I examined the patient at 11.30 p.m. She looked sallow but not ill, pulse 82, and blood-pressure unchanged. From the history of slight vaginal bleeding and abdominal pain a provisional diagnosis of intraperitoneal bleeding was made. However, abdominal examination failed to reveal any signs suggestive of this diagnosis. There was no tenderness or rigidity and she could move about actively in bed. The uterus was soft and, as previously noted, the foetus was lying transversely. Absence of foetal heart sounds was confirmed. During the examination the patient bitterly complained of shoulder pain, felt either in one or both shoulders, and this was what was troubling her most of all. Diaphragmatic pleurisy was also considered as a possible diagnosis, but there were no obvious clinical signs on examination of the chest. The clinical picture was bizarre, but as her condition gave no cause for anxiety laparotomy was not considered necessary.

On the following day she looked quite well. She had no abdominal pain, but still complained of shoulder pain. A little further vaginal bleeding had occurred. In the evening this increased and was bright red in colour, about half a pint (284 ml.) of blood being passed over a short period. There was no pain associated with the bleeding, and the shoulder pain had disappeared. Placenta praevia was thought likely, and a pint (570 ml.) of blood was transfused. Bleeding ceased spontaneously and the patient remained free from bleeding overnight.

Two days after admission vaginal bleeding recurred and remained persistent, accompanied by lower abdominal pain but no abdominal tenderness or shoulder pain. At 2.30 p.m. she was examined under general anaesthesia in the operating theatre, with the following findings. Slight bleeding was continuing. The cervix was dilated three finger-breadths but did not feel normal. The posterior lip was felt as a thick fibrous band with a soft spongy mass in the posterior fornix. Placental tissue was felt over the cervical os, but posteriorly the exact anatomy was not clearly determined. As the foetus was dead the fingers were passed through the placenta and a foetal foot was easily grasped and pulled down. After this the fibrous posterior lip of the cervix "vanished," and it was found that delivery of the foetus could easily be completed by slight traction. The placenta was the spongy mass felt in the posterior fornix and was delivered quickly after the macerated child had been extracted. Vaginal examination then revealed a midline posterior rupture of the uterus and cervix, extending down to involve the vagina in the posterior fornix, and the examining hand passed straight into the abdominal cavity.

Laparotomy was immediately performed. Some free blood was present in the peritoneal cavity and small pieces of old blood clot were attached to several areas of the bowel. There was an extensive complete rupture of the uterus in the midline posteriorly, extending from the lower half of the upper uterine segment down to the upper third of the vagina. The vaginal part of the rupture appeared to be of recent origin and probably associated with the delivery of the child, but the main rupture of the uterus and cervix had a smooth edge and was completely free from any bleeding.

Total hysterectomy was done without any technical difficulty. The patient's condition was good on its completion and she did not require transfusion either during or after operation. Her recovery was uneventful and she was allowed home on the 13th day after operation.

COMMENT

Silent antepartum rupture of the uterus is usually associated with a previous uterine scar, produced by caesarean section, myomectomy, or perforation of the uterus at the time of curettage. Spontaneous silent rupture of the intact uterus is exceptionally rare in the antenatal period, and if it occurs the rupture usually involves the uterine fundus in patients of high parity.

The situation of the rupture in the present case is unusual and difficult to explain. It is not thought likely that the type IV placenta praevia was responsible as the placenta was easily separated and removed, and part of the rupture was well above the placental site.

The patient's history throws some light on the possible cause. After her previous pregnancy, in which she spontaneously delivered a baby weighing 10 lb. (4,535 g.), apparently without difficulty, she made a slow recovery and complained of abdominal pain and severe shoulder pain which lasted for three or four days. The shoulder pain in the present pregnancy was exactly similar to that experienced after the last baby was born. It is likely that during the previous confinement she sustained an incomplete rupture of the uterus which left a thin weak fibrous scar down the posterior wall of the uterus.

One wonders if an unrecognized incomplete rupture at the time of a previous delivery might have been the cause in some of the recorded cases of silent antepartum rupture of the uterus.

Shoulder pain is a valuable sign of intraperitoneal blood. Even a small amount can cause this symptom, but it is important to realize that it may be 24 hours or longer after the bleeding has occurred before blood will track up under the diaphragm, and some cases of acute massive intraperitoneal bleeding may not initially have shoulder pain. Sooner or later, however, shoulder pain will usually appear, and it is in the doubtful cases with a slow leak of blood into the peritoneal cavity over a period of two or three days that such referred pain is of great diagnostic value.

The exact cause of intraperitoneal bleeding during late pregnancy is more difficult to diagnose. Silent rupture of the uterus, perforating placenta praevia, severe accidental haemorrhage, chorionepithelioma or invasive mole, rupture of an ovarian cyst, and rupture of uterine veins have all been responsible, and the diagnosis is rarely established before laparotomy. Nevertheless, the important point is to confirm the need for laparotomy by recognizing that intraperitoneal bleeding has occurred.

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The Water Pollution Research Board in its annual report concludes that the matters of greatest importance for the Laboratory's research programme at the present time are the study of the effects of polluting substances in streams and the investigation and improvement of the basic processes common to the treatment of sewage and of many industrial wastes. These basic processes include sedimentation of suspended solids, the "dewatering" of the resulting sludge, and the treatment of the liquid portion of the waste by biological methods; consequently these lines of research now take up a large proportion of the resources of the Laboratory. (*Water Pollution Research 1960*, published for D.S.I.R. by H.M.S.O., price 7s. (\$1.26 U.S.A.), by post 7s. 7d.)