ful, especially in controlling severe grades of reaction. The patients in this trial were all 3+ or 4+ grade of reaction at entry and had a history of similar reactions for months or years. In the random allocation, since both the groups consisted of patients with a similar severe reactional status, the comparative findings may be considered valid even though the trial was brief; for clofazimine in a dosage of 300 mg. a day dramatically controlled severe reactions as compared with prednisolone in the dosage used.

Considerably higher doses of prednisolone might have controlled the acute phase of the reaction. In such patients, however, it would be necessary to maintain the prednisolone at levels greater than 30 mg. a day for weeks to keep the reaction under adequate control. Such treatment in our experience led to severe complications in most cases, usually reactivation of tuberculosis, osteoporosis, fracture, and perforation of peptic ulcer.

In none of the patients on clofazimine was it necessary to discontinue treatment owing to deterioration, while in five patients on prednisolone it did become necessary. In the dosage used clofazimine was well tolerated and did not have any significant side-effect except hyperpigmentation. None of the patients was unhappy about this phenomenon; they were pleased to exchange pigmentation for chronic invalidism.

These patients must be observed for a longer period before comment can be made on the prophylactic efficacy of clofazimine in suppressing recurrence of reaction, but during this trial the number showing recurrence was small. The duration of the trial was also not long enough to assess the effect of clofazimine on lepra bacilli. This is under investigation in a double-blind trial in patients with untreated lepromatous leprosy.

The present study shows that clofazimine in a dose of 100 mg. three times a day is an effective treatment for severe erythema nodosum leprosum reaction in lepromatous leprosy and that it improves liver function in these chronically debilitated patients as judged by an appreciable rise in serum albumin levels. We were unable to find any deleterious effects of clofazimine on the cardiovascular, respiratory, alimentary, genitourinary, and nervous systems under the conditions of the trial at a dose of 300 mg. a day as judged by clinical and laboratory assessments.

We are grateful to all our colleagues, especially Mr. T. Doraiappan, the nursing superintendent, for supervising the technical details and for the day-to-day care of the patients. We thank Mr. Cyril Pratapkumar for help with the biochemical investigations and Mr. M. A. Furness and his team for help with neurological assessments. We would specially wish to thank Dr. Th. Ahrens, of Geigy, S.A., Basle, for making the drug available to us and for the financial grant to carry out the trial.

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Place of Culdocentesis in the Diagnosis of Ectopic Pregnancy

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British Medical Journal, 1970, 1, 200-202

Summary: In developing countries the high incidence of anaemia and pelvic infection often makes the diagnosis of ectopic pregnancy difficult. Culdocentesis has been used in 100 doubtful cases out of 144 consecutive cases of ectopic pregnancy. The preoperative diagnosis was correct in 93 out of the 100 cases. There were three false-negative and four false-positive results; only two unnecessary laparotomies were performed. It is suggested that culdocentesis has an essential place in the early diagnosis of doubtful or atypical ectopic pregnancy. It was simple, safe, and reliable. Owing to earlier diagnosis maternal mortality and morbidity and the duration of stay in hospital have all been reduced.

Introduction

Ectopic pregnancy is common in the tropics. Lawson and Stewart (1967) reported this as the commonest surgical emergency occurring in the West Indies. The diagnosis of ectopic

pregnancy may be the most perplexing in gynaecology. In developing countries the high incidence of anaemia and pelvic infection greatly adds to the difficulty in diagnosis. Even if catastrophe is avoided, delay in making the diagnosis increases the chances of significant morbidity and incapacity of the patient (Riva et al., 1962). Continued observation in doubtful cases may lead to prolonged hospital stay, which a developing country or any other can ill afford with the present shortage of hospital beds generally.

The occasional report advocating culdocentesis has appeared in the American literature. Many British gynaecologists are still of the opinion that the procedure is of limited value and may be misleading and dangerous (Douglas, 1963). The present study was undertaken to investigate the place of culdocentesis in the early diagnosis of ectopic pregnancy.

Materials and Methods

All cases of ectopic pregnancy admitted to the department of obstetrics and gynaecology between January 1966 and February 1969 were included in this study. In this period there were 22,912 live births and stillbirths and 144 ectopic

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pregnancies, giving an incidence of 1 ectopic pregnancy for every 159 births. In other series the ratio varies between 1 in 45 (Škulj, 1960) and 1 in 176 (Schiffer, 1963), while the highest incidence of 1 in 28 is reported by Douglas (1963), in the West Indies.

The sites of implantation are shown in Table I. Four of the cases were of unruptured tubal pregnancy.

TABLE I.—Sites of 144 Ectopic Pregnancies

Tubal	Interstitial	13	Abdominal	7
	Isthmus	25	Ovarian	1
	Ampulla	55	Cervical	1
	Fimbria	21	Uterine diverticulum ..	1
	Unknown	16	Rudimentary horn	1
	Stump	2	Refused operation	1

Age and Past Obstetric History.—In most cases the patient's exact age was not known, but probably about 70% of patients were under 30 years. Of the 144 patients 27 (18.8%) were pregnant for the first time, 10 (6.9%) had had only previous abortions; and 107 (74.3%) had had one or more previous term deliveries in addition to abortions in some cases. One patient had had a previous ipsilateral tubal pregnancy and five patients presented with previous ectopic pregnancies in the contralateral tube. The largest number of patients in this series were therefore young and had had previous pregnancies. Other writers have reported between 25% (De Alvarez and Nisco, 1961) and 35% (Schiffer, 1963) of ectopic pregnancies occurring in patients pregnant for the first time.

Signs and Symptoms

The commonest combination of symptoms in this series was pain and abnormal vaginal bleeding. Pain was the most prominent symptom in 82% of cases. Unilateral pain occurred in a quarter of the cases. Radiation to the shoulder region was reported in only 16%. In 15% there was complete absence of pain or discomfort.

Vaginal bleeding of one form or another was present in 66%. A history of one or more missed periods was given in 77%. In 15% there was a normal menstrual history. In the remaining cases the history was either incomplete or unreliable. Other symptoms of pregnancy and fainting, vomiting, or epigastric discomfort were present in a minority of cases. Tenderness with or without rebound tenderness on abdominal examination was elicited in 89% of patients. As in other series (Riva *et al.*, 1962; Schiffer, 1963; Fielding *et al.*, 1965) this is the most common finding. Cervical excitation pain was a frequent sign; however, the same degree of tenderness may be obtained in other conditions such as salpingitis. An abnormal mass in the adnexa or pouch of Douglas was noted in 30%.

Severe shock was present in 32% of our cases compared with 15.9% reported by Riva *et al.* (1962). Clinically the presentation was "acute" in 36%, "acute-on-chronic" in 34%, and "chronic" in 30%. These figures are at variance with those of Riva *et al.* (1962), who reported only 15.9% acute and 84.1% chronic ectopics, and with those of Douglas (1963), who reported 41% and 32% respectively. The high incidence of acute and acute-on-chronic cases is striking. This may account for the high rate of blood transfusion. Blood was not used in six patients. In the remainder an average of 2.8 pints (1.6 litres) per patient was considered necessary. The largest transfusion in this series was 9 pints (5.1 litres) of blood. Autotransfusion has not been used at this hospital, Wille (1967) having pointed out two dangers of autotransfusion.

The temperature was raised above 100°F. (37.8°C.) in some patients and jaundice was found in three. Cullen's sign was never detected.

Treatment and Results

The operation that can be performed with dispatch and is sufficient to control haemorrhage is the treatment of choice. Blood may be transfused before or during the operation, but the operation is not delayed if the patient's condition is poor. Immediate laparotomy and haemostasis may be the only method of saving a moribund patient's life. The selection of operative treatment is indicated in Table II.

TABLE II.—Operative Treatment in 144 Cases

Salpingectomy	87
+ contralateral salpingolysis	3
+ contralateral salpingostomy	2
+ omentectomy	1
Salpingo-oophorectomy	23
+ contralateral salpingectomy	2
Cornual resection	7
Excision of uterine diverticulum	1
Excision of rudimentary horn pregnancy	1
Total hysterectomy	6
Packing of endocervical cavity	1
Conservation of Fallopian tube	4
?Salpingectomy—inadequately recorded	4
Refused treatment	1
Died on admission	1

Salpingectomy was the treatment of choice in 60% of cases, followed by salpingo-oophorectomy in about 16%. Fourteen unusual cases were treated as follows:

Abdominal Pregnancy.—There were seven cases, three of which were advanced beyond 28 weeks' gestation. Three cases were treated by hysterectomy. In every case the placenta was completely removed. One live infant who is thriving was saved in this group.

Uterine Diverticulum.—Rupture of a uterine diverticulum containing a pregnancy was found once, and is reported elsewhere as the fourth such case in the literature (Hassim, 1968). The diverticulum was excised and the uterus reconstituted.

Rudimentary Horn Pregnancy.—One patient presenting with an acutely tender uterus at 32 weeks' gestation thought at first to be a concealed accidental haemorrhage was discovered to have a rudimentary horn pregnancy at laparotomy (Hassim *et al.*, 1968).

Cervical Pregnancy was reported once and packing of the endocervical canal controlled the bleeding. Recovery followed a 7-pint (4-litre) blood transfusion.

Conservation of the Fallopian tube was carried out under special circumstances. All four patients had no living children, their condition during operation was satisfactory, and the opposite tube was beyond repair. Two cases of tubal mole, one case of tubal abortion, and one of fimbrial pregnancy were treated in this manner after products of conception had been removed and haemostasis secured.

Maternal Mortality

Two maternal deaths (1.4%) occurred in this series. The first of these patients was admitted in a severely shocked state. At laparotomy 4 pints (2.3 litres) of blood and clots was removed from the peritoneal cavity. Salpingectomy for a ruptured ampullary pregnancy was performed. About three hours postoperatively, while on her third pint of blood, cardiac failure with acute pulmonary oedema supervened; this failed to respond to treatment. The second patient died on the way to the gynaecological department. This death might have been avoided if adequate resuscitation had been carried out before transfer.

Discussion

Diagnostic Aids

A careful history and clinical examination and a high index of suspicion are absolutely essential. We agree with Wood and Martyn (1957) and Webster *et al.* (1965) that laboratory procedures such as pregnancy tests, white blood cell count, and vaginal swab are of limited value. Serial haemoglobin estimations may be helpful in the chronic ectopic. Histological

examination of the endometrium, which was done in known cases of ectopic pregnancy, proved equally disappointing. The endometrium may show changes reflecting proliferative or secretory activity, resting phase or decidual reaction, or varying combinations of these (Birch and Collins, 1961). The Arias-Stella reaction is reported to occur in 10-25% of cases. Boyce and Rollins (1966), however, believe that the reaction occurs equally in intrauterine and extrauterine pregnancy.

Culdocentesis

This procedure proved to be the most important single diagnostic aid in our cases. Culdocentesis was performed in 100 out of the 144 cases (68%). It was employed as a side-ward procedure without an anaesthetic in 89 cases. In the remaining 11 an anaesthetic was used. In about a quarter of the patients premedication with pethidine was necessary.

Technique.—After bimanual examination a bivalve speculum is introduced and the vagina swabbed with antiseptic solution. The posterior lip of the cervix is grasped and gently pulled forward and anteriorly, thus exposing the posterior fornix. A 5-in. (12.7 cm.) size 18 needle is inserted into the pouch of Douglas for about 1 in. (2.5 cm.). Suction with a 10-ml. syringe is applied as the needle is withdrawn. The aspirated fluid is then examined macroscopically and submitted for microscopy and culture if necessary. Ectopic blood is dark and does not clot. Typically, a few tiny dark clots are found in the unclotted blood. This is important. At least four laparotomies were avoided by re-examination of the withdrawn blood by the registrar. (The new resident, however, soon acquires the technique.) Should the needle enter an artery or vein the blood clots. In pelvic inflammatory disease pus or cloudy exudate may be aspirated. Similarly, chocolate-coloured material may be obtained from an endometrioma and ascitic fluid in other conditions (Webster *et al.*, 1965).

All suspected cases are subjected to culdocentesis on admission. The preoperative diagnosis was correct in 93 of the 100 cases in which culdocentesis was performed. Of the remaining 44 cases, eight were not suspected of ectopic pregnancy on admission; culdocentesis three to nine days later was positive for ectopic blood. The other 36 cases presented no difficulty. In the total series 82% were operated on within three hours of admission. The high percentage of correct diagnoses (93%) compared with other series (55%, Bobrow and Winkelstein, 1955; 88.9%, Armstrong *et al.*, 1959; 72%, Douglas, 1963) we feel is due to the more frequent use of culdocentesis.

False-negative results were obtained in three cases. In two of these peritoneal haemorrhage was absent; one was an unruptured ectopic and the other presented with a broad ligament haematoma. The clinical history and findings subsequently prompted laparotomy. False-positive results occurred in four cases: one each of torsion of an ovarian cyst and rup-

tured ovarian follicle, and two cases of pelvic infection. Consequently two unnecessary laparotomies were done.

A negative result does not absolutely exclude an ectopic gestation, and the procedure may have to be repeated. During the same period as the present series culdocentesis was performed on another 55 doubtful cases when clear peritoneal fluid, purulent material, or nothing was aspirated. None of these patients has yet returned with a ruptured ectopic pregnancy. With size 18 needle, even if a pyosalpinx or adjacent bowel were perforated, no mortality or morbidity from this cause has occurred. Culdocentesis is valuable to residents at odd hours of the night, and costly errors may be reduced to a minimum (Armstrong *et al.*, 1959).

Coeloscopy or laparoscopy is not favoured. In Zambia pelvic infection has proved to be the commonest cause of confusion with ectopic gestation. Pelvic adhesions in these cases may not only obscure the field of examination but the large trocar may easily damage bowel when plunged into the peritoneal cavity. In addition a general anaesthetic is usually required. The same objections apply to culdoscopy and colpotomy.

Ultrasound compound sector scanning, as an aid in the diagnosis of ectopic pregnancy, showed an overall error of 25.6% and further work in the field is necessary to improve the diagnostic error (Kobayashi *et al.*, 1969).

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