THE MANAGEMENT OF SEPTIC ABORTION AT GROOTE SCHUUR HOSPITAL*

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'Sooner or later, insensibly, unconsciously, the iron yoke of conformity is upon our necks; and in our minds, as in our bodies, the force of habit becomes irresistible.'

William Osler, Harveian Oration 1906

Septic abortion is one of the commonest of gynaecological diseases and is one of the commonest causes of maternal death. Septic incomplete abortion, often complicated by septic shock and/or renal failure, accounted for approximately one-third of the admissions to Groote Schuur Hospital in the years 1960 - 1967. There were on an average 4 - 5 deaths per year. The number of abortions treated, together with the incidence of deaths per total number of abortions within this period, was as set out in Table I.

TABLE I. DEATHS RESULTING FROM ABORTION (1960–1967)

Year	*Total No. of abortions*	*Deaths*	%
1960	1,304	3	0·23
1961	1,465	3	0·20
1962	1,577	4	0·26
1963	1,523	7	0·46
1964	1,936	5	0·26
1965	1,887	6	0·32
1966	1,910	5	0·26
1967	1,862	3	0·16
Total	13,464	36	0·27

Although the management of most incomplete abortions may at first appear routine, these cases are filled with pitfalls for the unwary and the uninitiated, particularly in a large department, where shortage of beds demands rapid turnover and the majority of patients remain in hospital for less than 48 hours.

A recent study analysed the deaths occurring in the period 1960 - 1965 at Groote Schuur Hospital.[1] It was concluded that deaths following septic abortion can be divided into two main groups:

1. The unavoidable deaths, which occur largely in patients presenting too late for effective therapy—either moribund or with, in the present state of medical science, irreversible damage to the kidneys or other essential organs. Such deaths would only be prevented by a radical change in the social pattern.
2. The potentially salvageable group (approximately 25%) in which the hazards of sepsis, endotoxin shock, haemorrhage and anuria are well recognized but in which an awareness of the potential danger is often lacking.

Mortality rates quoted by various authors from 1940 to 1965 are listed in Table II. The figures from Groote Schuur Hospital are noted to fall between two extremes.[1]

Stimulated by the above investigation and the success of isoprenaline in our department,[2] we set out to devise a scheme of management for the treatment of septic abortion and septic abortion with septic shock and/or renal failure as manifest at Groote Schuur Hospital (see Appendix).[3] Its basic theme is to stimulate an awareness of the potential dangers in these patients and by so doing to obviate them.

TABLE II. MORTALITY RATES FOLLOWING ABORTION REPORTED ELSEWHERE

Author	*Years*	*No. of abortions*	*Type*	*No. of deaths*	*Mortality rate %*
Studdiford	1940–49	4,129	Combined	17	1·08
Burnett	1946–50	2,322	Combined	4	0·09
Burnett	1946–50	267	Septic	2	0·75
Ramsay	1950–55	995	Septic	4	0·40
Perera	1951–59	8,347	Combined	5	0·06
Schwarz	1954–64	10,000	Combined	29	0·29
Groote Schuur Hospital	1960–65	9,692	Combined	28	0·29

There are 94 gynaecological beds at Groote Schuur Hospital and the number has remained unchanged since 1960.

The next step taken to improve and standardize the management of these cases over the last two years (1967 and 1968) was to set aside 11 of these beds to form a septic abortion unit.

THE CLINICAL PICTURE

The cases can be broadly divided into 6 groups:

1. Cases with infection localized to the products of conception with or without a localized endometritis
2. Cases with spreading endometritis, salpingitis and/or pelvic abscess formation
3. Cases with pelvic peritonitis and generalized peritonitis
4. Cases associated with shock, either hypovolaemic or septic
5. Cases associated with renal failure
6. Cases associated with *Cl. welchii* infection

It will immediately become apparent that these groups are not clear-cut, separate entities and that there is a considerable overlap in their clinical presentation. It must also be categorically stated at the outset that we have, in our department, adopted the attitude—cynically but probably correctly—of regarding all incomplete abortions as criminal and all criminal abortions as septic. The management of shock, renal failure and *Cl. welchii* infection in septic abortion presents a major problem and will be discussed separately.[3]

Group 1: Cases with Localized Infection

These patients present soon after the induction of the abortion. The clinical features are pyrexia, tachycardia and an offensive vaginal discharge. There is no evidence of extra-uterine tenderness, and anaemia and shock—if present—are directly proportional to the visible blood loss. Urinary output is good. The problem in the manage-

*Date received: 2 April 1969.

ment of these cases revolves round the treatment of the local sepsis. This treatment depends upon:

(*a*) identification of the causal organism(s);
(*b*) selection of the best antibiotic—namely the one to which the organism is highly sensitive, but it must also be the least toxic antibiotic;
(*c*) the administration of this antibiotic in an appropriate form; and
(*d*) the correct timing of the evacuation.

In order to answer the first 3 questions, a study was undertaken in our unit.[4] In this series bacteriological studies were done on 96 cases (Table III).

TABLE III. PATHOGENIC ORGANISMS CULTURED FROM CERVICAL SWABS

Organism	*No.*
Coliforms	24
Cl. welchii	9
*Beta-haemolytic strep.	4
Enterococci	3
**Staph. aureus*	2
Achromobacter	2
Paracolons	2
Total	46

*These are not vaginal commensals.

It should be noted that high vaginal swabs are of no value because perineal commensals, including *Cl. welchii*, would be cultured. The cervical swab in septic abortions will identify either a normal commensal in an abnormal situation or a definite pathogen.

Bacteriological sensitivity tests were done on all cultures and these were plated aerobically and anaerobically. All organisms were highly sensitive to tetracycline and chloramphenicol. Because of the risk of toxicity of chloramphenicol (leucopenia, thrombocytopenia and pancytopenia), tetracycline was accepted as the drug of choice. This is usually given in the form of rolitetracycline phosphate, which gives very rapid high blood levels by intramuscular injection in the dosage of 350 mg. *stat.* and 350 mg. twice daily thereafter.

The antibiotic must be given to the patient immediately on admission. To wait is hazardous. The antibiotic of choice must be determined locally and reviewed periodically. An antibiotic which works well in one hospital will not necessarily do so in another and an antibiotic which is efficacious this year may not be so next year.

ATS or tetanus toxoid, whichever is considered to be appropriate, is given as a routine by the casualty officer.

The timing of the evacuation. To give an antibiotic and to attempt to treat a patient without the removal of infected, ischaemic, necrotic products of conception is illogical.[5-7] Fear of early evacuation probably arose during the pre-antibiotic days and from the failure to recognize those few cases in which evacuation may be dangerous, namely rupture of the uterus and extra-uterine inflammation. Early evacuation of the uterus in the majority of cases removes the source of the infection and thereby hastens recovery and cure. There is, however, much to be said for waiting 12 - 24 hours from the commencement of antibiotic therapy before proceeding with the evacuation. This ensures: (*a*) adequate tissue levels of the antibiotic at the time of the evacuation; (*b*) proper evaluation of the patient; and (*c*) adequate assessment and detection of such complications as anuria.

It is noteworthy that only 3 out of the 28 patients who died in Utian's analysis had been evacuated.[1]

The average hospital stay after evacuation in a series of our patients was 1·5 days.[4] This compares more than favourably with the figures of Moritz and Thompson,[8] who performed curettage only when the patient had been afebrile for 12 - 24 hours and reported an average hospital stay of 6·3 days.

Following early evacuation, an immediate sharp rise in temperature is occasionally observed. With adequate blood levels of the antibiotic, however, the bacteraemia, which is probably the cause of the pyrexia, is dealt with promptly. The temperature invariably settles as rapidly as it has risen.

Among the South African Bantu, patients not uncommonly seek a criminal abortion when their pregnancies are well advanced into the second trimester. These patients are often acutely ill because of chorio-amniitis with a retained foetus. It is imperative to empty the uterus as quickly as possible in these cases, using an intravenous infusion of oxytocin, if necessary going up to relatively large doses, e.g. 60 units/litre. If abortion is complete, subsequent curettage is not indicated.

In summary we agree with Schwartz[7] that an aggressive approach provides more prompt recovery with a lower incidence of complications such as chronic pelvic infection, endotoxic shock and renal failure.

Group 2: Cases with Extra-uterine Spread

These cases differ from group 1 only in that they have marked uterine and extra-uterine tenderness. On bimanual examination, the vaginal fornices are tender and may be palpably thickened. It is better to delay evacuation until the signs of acute inflammation have subsided. In these cases we have found that too early evacuation of the uterus often causes an exacerbation of the condition if carried out before the inflammation has responded to antibiotics; moreover, it is not possible to remove the bulk of the infection by emptying the uterus. Laparotomy and drainage may be necessary if a pyosalpinx is present, and pelvic abscesses may require drainage by colpotomy or laparotomy.

Group 3: Cases with Pelvic and/or Generalized Peritonitis

The pathological process is one of spreading endometritis, salpingitis and peritonitis. These cases are usually bacterial in origin and often present late—several days after the abortion. Other patients, however, present with the early onset of peritonitis and these cases may be due to rupture of the uterus produced by instrumentation or to the injection of an abortifacient substance, usually soap solution or Dettol, under pressure through the fallopian tubes. These latter cases initially have a chemical peritonitis, though they may later become secondarily infected.

In this group of patients, X-ray films of the abdomen taken in both the supine and erect positions are an essential guide to diagnosis and may reveal the presence of ileus, free fluid in the abdomen, air under the diaphragm, or a radio-opaque foreign body in the uterus or peritoneal cavity.

Until approximately March 1968 this group was managed essentially conservatively, with antibiotics, intravenous fluids and nasogastric suction. Evidence of perforation, e.g. air under the diaphragm or the presence of a foreign body, was, however, regarded as indication for immediate laparotomy.

Since March 1968, a progressively more radical policy has been adopted and at the present time all cases of septic abortion with clear evidence of generalized or spreading peritonitis are subjected to laparotomy. The conditions found, which had often not been recognized or suspected clinically, included:

1. Peritonitis with large amounts of free purulent fluid or pus and on occasion blood, soap and antiseptic solutions.
2. Peritonitis with loculated (and unsuspected) abscesses, including subphrenic, paracolic and multiple loculated abscesses throughout the peritoneal cavity.
3. Injuries to bowel and other abdominal viscera.
4. Foreign bodies in the abdomen.
5. Perforation of the uterus and other pelvic structures, including uterine and other arteries with broad ligament and retroperitoneal haematomata.
6. A grossly infected, necrotic or gangrenous uterus with gross damage due, for example, to injection of fluid under high pressure.

Exploration by peritoneoscopy (which is obviously dangerous) or by a small incision and a Ferguson's speculum has been advocated, but in our experience this does not permit a proper appraisal of the nature and extent of the conditions or injuries present within the abdomen. A sub-umbilical paramedian incision causes very little extra disturbance and permits a proper assessment and treatment of whatever is found. This incision may be extended as required, for example in the case of multiple abscesses and subphrenic abscesses.

The procedures carried out at laparotomy depend upon the conditions found. These include: simple evacuation and drainage of pus or other fluid with, if necessary, breaking down of encapsulated loculi; drainage of these sites—in some cases multiple drainage with drains, e.g. in the subphrenic space and both iliac fossae, may be required; repair of bowel and/or other viscera; removal of foreign bodies; and hysterectomy.

The place of hysterectomy in these cases is possibly one of the most difficult and debatable. Our experience, nevertheless, indicated that early laparotomy in all cases of generalized or spreading peritonitis with the institution of appropriate treatment results in a considerable reduction in morbidity and mortality.

SUMMARY

The management of septic abortion at Groote Schuur Hospital is reviewed. An attempt is made to stress a more aggressive approach to the management of septic abortion with early evacuation and early laparotomy when indicated. We feel that this approach provides more prompt recovery with a lower incidence of complications such as chronic pelvic infection, renal failure and endotoxic shock. We have consciously attempted to throw off the yoke of conformity.

A scheme for the management of septic abortion is presented in the Appendix.

The management of septic abortion complicated by endotoxic shock, renal failure and *Cl. welchii* infection, as seen in our unit, will be presented in a subsequent communication.

We wish to thank Dr J. G. Burger, Medical Superintendent of Groote Schuur Hospital, for permission to publish.

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APPENDIX: MANAGEMENT OF SEPTIC ABORTION

1. When first seen all cases must have:
   (*a*) initial quick assessment, including general condition, blood loss, pulse rate and volume, blood pressure and temperature;
   (*b*) examination of abdomen, CVS, respiratory system, jugular veins, lung bases and extremities.
2. Perform vaginal examination, take cervical swab for culture and sensitivity. Remove any products of conception from cervical os either digitally or with ovum forceps.
3. Give ergometrine maleate 0·5 mg. intramuscularly to all patients with persistent vaginal bleeding.
4. Set up an intravenous drip in every case and give 1,000 ml. Plasmalyte B at 40 drops/min. and take blood for haemoglobin and cross-matching.
5. Give 2 pints of blood as soon as available (replacing Plasmalyte B) in all cases where:
   (*a*) systolic blood pressure is 90 mm.Hg or less;
   (*b*) haemoglobin concentration is 10 G/100 ml. or less; or
   (*c*) there is active bleeding.

   All patients receiving blood must have a ½-hourly pulse chart and nursing staff must be instructed to report *any rise of pulse rate of more than 20/min. above initial pulse rate.*
6. Set up central venous pressure manometer in all cases with a blood pressure of 90 mm.Hg or less. These patients must then be managed according to shock regimen.[3]
7. Do blood culture of all patients with temperature of 101°F or more.
8. Start antibiotic therapy immediately and give intramuscular injections of rolitetracycline phosphate (Reverin) 350 mg. *stat.* and 350 mg. *b.d.* thereafter.
9. All patients must have
   (*a*) 4-hourly temperature, pulse and blood pressure charts;
   (*b*) accurate intake and output chart; and
   (*c*) medicament chart.
10. At the end of the first 4 hours all patients must be reassessed for signs of shock and heart failure, including
   (*a*) blood pressure, temperature and pulse;
   (*b*) examination of neck veins, lung bases, abdomen and blood loss; and
   (*c*) urinary output.

   If the patient has not passed urine she must be catheterized.
11. Evacuation of uterus to be performed on all patients within 24 hours unless
   (*a*) earlier evacuation becomes necessary because of persistent haemorrhage;
   (*b*) there are signs of *extra-uterine* inflammation;
   (*c*) the uterus is bigger than at 14 weeks' gestation and foetus is *in situ;* or
   (*d*) there are signs of uterine perforation or rupture.
12. Patients to be discharged provided
   (*a*) they are generally fit and there is no bleeding or other signs or symptoms;
   (*b*) temperature is less than 99°F (and more than 97·4°F); and
   (*c*) they are passing adequate amounts of urine of SG greater than 1·010 (SG must be checked before discharge).

All patients must be discharged on sufficient oral tetracycline to complete 5 days' course and ferrous sulphate tabs. 1 *b.d.* for 1 month.