FULMINATING OBSTETRIC GAS GANGRENE

A Report and Discussion on Six Cases

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SUMMARY: Six patients with fulminating gas gangrene were treated. In each case the cause was long obstructed labour with retention of the dead foetus. Treatment was by caesarian section and hysterectomy with the excision of all infected tissue. In two cases this involved partial removal of the bladder. All patients received gas gangrene antitoxin and high dosage penicillin. Three patients survived.

Introduction

The patients were treated by the author during a two year tour in the British Military Hospital, Dharan, Nepal. It reflects the primitive level of obstetric care in hill regions in that each case was the result of long obstructed labour with retention of the dead foetus.

Gas gangrene

Infection is caused by three species of clostridia. They are, *Clostridium perfringens* type A, *Clostridium novyi* types A and B and *Clostridium septicum*, separately or in combination. The organism is a spore forming, non motile, encapsulated, gram positive bacillus. The metabolism of the clostridial group is anaerobic, so that a prerequisite for growth is a lowering of the local tissue oxidation-reduction potential. Holtz and Mauch (1962) summarised the pathological sequence necessary for the development of a clostridial infection:

1. The organism must be introduced into the uterus from without, or in rare instances the organism, already present in the vagina or cervix, must be carried into the uterus.
2. Dead tissue must be present at the time the organisms are introduced.
3. The injured tissue, or pabulum, must remain in the uterus for a sufficient time to permit incubation of the organism.
4. Damaged maternal tissue must be exposed to the bacteria.

The clostridial group of organisms produce a number of powerful exotoxins which include Alpha toxin, Theta toxin, Kappa toxin, Mu toxin and Nu toxin. Others have been postulated including a fibrinolysin, a myotoxin, a neurotoxin and a nephrotoxin.

General findings and treatment

History

It is not possible to get an accurate history, but patients had taken from three to seven days to reach hospital following obstructed labour. A forceful attempt at delivery had been made by a Witch Doctor in three cases. This included burning both knees down to the bone.

Examination

Prostrated ill patients alert and fully aware of surroundings. Temperature varying from 99-101°F. Pulse rates from 120-160 per minute.

Abdomen: hard, tender uterus with crepitus. Vaginal examination: foul smelling discharge. Arm, leg or mushy caput of foetus in the vagina.

Laparatomy

Foul smelling, brownish fluid was present in the Pouch of Douglas. The peritoneum and bowel were discoloured and oedematous. The uterus and adnexa were distended and discoloured with gas between the muscle fibres. Gas was present behind the utero-vesical peritoneum. In three cases the uterus was found to be ruptured.

Surgery

a. Caesarian section was by the classical route or through a high transverse incision. b. Hysterectomy was performed and extended when necessary to excise all infected gangrenous tissue. The procedure was difficult because grossly oedematous tissues obscured normal pelvic anatomy. c. Partial cystectomy was performed in two cases for large gangrenous defects of the bladder fundus.

Polyvalent gas gangrene antitoxin

By the intravenous route three ampoules were given initially followed by three ampoules at four hourly intervals. Treatment was continued until clinical improvement was observed.

Penicillin

Intramuscular penicillin was given in a dose of two mega units at two hourly intervals.

Case histories*Case 1. Aged 38 years*

Surgery. a. Classical caesarean section was performed and the incision extended behind the bladder. b. Hysterectomy, including the excision of all gangrenous tissues, and left salpingo-oophorectomy. c. Partial cystectomy to excise all gangrenous tissue.

Comment. The macerated gangrenous foetus was deficient of the left hand and the skin covering the left forearm, so that both radius and ulna were fully exposed. A forceful attempt at delivery by traction on the prolapsed arm had been unsuccessful. Patient survived.

Case 2. Aged 23 years

Surgery. a. Caesarian section through a high transverse incision. b. Hysterectomy which was extended to excise all infected tissue. A drain was left in the peritoneum.

Comment. Six hours after operation the patient showed distressed respirations and the pulse rate rose to 180 per minute. This patient in obstructed labour had spent two days searching for the Witch Doctor before beginning the journey to hospital that took one day to complete. Patient died.

Case 3. Aged 22 years

Surgery. a. Caesarian section through a high transverse incision. b. Sub-total hysterectomy with excision of gangrenous tissue. c. Partial cystectomy with excision of all infected tissue. A drain was left in the peritoneum and in the bladder.

Comment. On admission this patient had a pulse rate of over 160 per minute. She was delirious and had severe respiratory distress. Patient died.

Case 4. Aged 24 years

Surgery. a. Classical caesarian section in which the incision extended behind the bladder. b. Sub-total hysterectomy to excise all infected tissue. A drain was left in the peritoneum.

Comment. The patient survived.

Case 5. Aged 36 years

Surgery. a. Caesarian section through a high transverse incision. b. Sub-total hysterectomy to include infected tissue. A drain was left in the peritoneum.

Comment. This patient had a pulse rate of over 160 per minute on admission with respiratory distress. The operation was carried out on the hospital verandah in the monsoon season. Patient died.

Case 6. Aged 30 years

Surgery. a. Classical caesarian section. b. Total hysterectomy extended to include all infected tissue with bilateral salpingo-oophorectomy. A drain was left in the peritoneum.

Comment. On incising this grossly distended gangrenous uterus there was a loud explosion accompanied by a spraying of foul smelling pus. Patient survived.

Discussion

Recent papers on obstetric gas gangrene show different views on basic management. Opinions vary along three lines:

1. The place and the extent of surgery.
2. The use of gas gangrene antitoxin.
3. The use of hyperbaric oxygenation.

Surgery

In all six cases reported in this series the disease was fulminating because of delay in reaching hospital. The principle adhered to was the removal of all infected tissue. Caesarian section was followed by hysterectomy extended when required to excise all gangrenous tissue. In two cases half the bladder was excised, with removal of the left adnexum in one case.

The place and the extent of surgical debridement however is not well defined. De Lima and Delascio (1966) treated three cases of obstetric gas gangrene. The first by caesarian section, the second by sub-total hysterectomy and the third by removal of the foetus with saline rinsing out the peritoneal cavity. Jones (1965) stated that if the uterus was in good condition it sufficed to remove the septic foetus by curettage. Further

support for the non-radical approach comes from the series of Rendle-Short (1942) and Godsick et al (1954) who believe that treatment with antitoxin and antibiotics is sufficient for obstetric gas gangrene.

In agreement with the treatment advocated in this group of patients is the series reported by Smith, McLean and Maughan (1971). In their patients adequate debridement implied total abdominal hysterectomy with bilateral salpingo-oophorectomy. Also Browne et al (1966) treated two cases by total abdominal hysterectomy.

Gas gangrene antitoxin

Polyvalent gas gangrene antitoxin was used in the six patients reported in this series. Allowing for the potential hazards of a horse serum it was deemed wrong to withhold a possible benefit in seriously ill patients. Butler (1945) estimates an overall mortality of 85 per cent, and Smith, McLean and Maughan (1971) a mortality of 50 per cent in spite of adequate medical treatment. However, treatment with antitoxin is not universally accepted. Workers evaluating hyperbaric oxygenation in the treatment of obstetric gas gangrene have given up routine use of the antitoxin. Support for its use is given by the experimental work of Boyd, Thomson and Walker (1972) who demonstrated that the survival rate of sheep inoculated with the spores of *Clostridium novyi* type A was increased when antitoxin was given.

Hyperbaric oxygenation

This treatment was not available to the patients treated in this series. Brummelkamp, Boerma and Hoogendyk (1963) reported successful treatment of obstetric gas gangrene with hyperbaric oxygenation. A more recent report, Smith, McLean and Maughan (1971), is less encouraging. The authors state that their experience with hyperbaric oxygenation in the treatment of obstetric gas gangrene has not been satisfactory.

Conclusion

- a. Radical surgery accompanied by antitoxin and penicillin provided the logical treatment of established obstetric gas gangrene. It is difficult to see how small foci on infected devitalised tissue can be eliminated by any procedure other than radical surgery which aims at removing all infected tissue.
- b. It is difficult to withhold antitoxin from a seriously ill patient despite the known hazards of a horse serum.
- c. The place of hyperbaric oxygenation in obstetric gas gangrene is not decided.

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