

BACTERAEamia AS A CAUSE OF OBSTETRIC SHOCK

BY

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OBSTETRIC shock as a complication of labour is fully discussed in most textbooks of midwifery. Sheehan (1948) recorded 147 cases who died of shock and reviewed the recognized causes. Infection, however, has not been mentioned by him or other authors who have discussed the aetiology. Obstetricians familiar with conditions in primitive parts of the world are aware of the profound shock which is associated with severe infection acquired during childbirth. That a similar state may be seen in this country is illustrated by the following 2 cases.

Case 1

Mrs. R., age 30, was admitted to hospital on 20th November, 1951 because she was 20 days overdue in her first pregnancy. She had had trichomonas vaginitis treated during pregnancy. At 11.15 a.m. surgical induction was performed by rupture of the forewaters. The following morning labour had not started, and she complained of feeling cold. Her temperature was 100.5°. At the onset of labour 26 hours after induction the patient's temperature was 103° and pulse rate 120 per minute. Examination revealed no obvious cause for the pyrexia. Vaginal swab, urine examination and blood culture were taken. Sulphadimidine and, 3 hours later, penicillin therapy was started.

Labour lasted 4 hours. At the start of the second stage there was severe foetal distress. An easy low forceps delivery was performed under general anaesthesia, but the baby, weighing 5 pounds 5 ounces was stillborn. Thick purulent offensive meconium-stained liquor was aspirated from the baby's mouth. Placenta and membranes were delivered 15 minutes later, and the episiotomy repaired. The total blood loss was 4 ounces (113 ml.).

One and a half hours after delivery the patient was gaining consciousness. She was flushed and perspiring, temperature 101.8°, pulse 160 and respirations 20 per minute. Her blood pressure could not be recorded. There was no vaginal bleeding and the uterus was well contracted. Vaginal examination showed no evidence of uterine rupture.

She was put in an oxygen tent, and Methedrine was

given. Penicillin and streptomycin were also injected. She remained in a condition of profound shock for 3 hours during which time no blood pressure reading could be obtained. After that, she gradually improved, and ultimately made a satisfactory recovery. She has since had 2 normal deliveries.

The results of the bacteriological examination showed that the urine was sterile. The vaginal swab showed numerous pus cells and, on culture, a heavy growth of *Bacterium coli*. Similarly, there was a heavy growth of *Bact. coli* in the blood culture.

This case illustrates that severe shock can result from bacteraemia acquired in labour. The uterine cavity would appear to have been infected during surgical induction.

Case 2

Mrs. C., age 24, had a normal delivery of a second baby at home on 12th January, 1955 at 11.10 a.m. Following this she had a post-partum blood loss of 20-30 ounces with continued uterine filling of blood in spite of the use of oxytocic drugs. The "flying squad" was therefore summoned and arrived at 1.30 p.m. The patient was conscious, pale and rational. Her blood pressure was 90/70. A blood transfusion of 2 pints (1,136 ml.) of Group O blood was given. During the second bottle, as the last few ounces were going in, the patient vomited. At 3 p.m. her blood pressure was 130/70. The uterus was contracted. Her general condition was, however, not satisfactory. She was confused, restless and flushed, and vomiting continued. A steady trickle of blood issued from the vagina.

She was transferred to hospital arriving at 5.15 p.m. by which time she was comatose. Her face was a bright scarlet, the colour extending down the neck with a patchy erythema of the rest of the body. Her temperature was 101°. Her pulse and blood pressure could not be obtained. The uterus was flaccid. Three hundred ml. of liquid blood were expelled from the vagina. One hundred ml. of urine were obtained. Blood was taken for a blood count and culture.

On admission, ergometrine was given and intravenous Dextraven (250 ml.) followed by 740 ml. of cross-matched blood to which were added 3 ml. of noradrenaline (Levophed). Penicillin, streptomycin and cortisone

(100 mg.) treatment was also started. Blood which was withdrawn from a vein failed to clot, and wherever the patient was pricked a haematoma formed. Fibrinogen was therefore given. Intravenous therapy was continued with 5 per cent glucose solution as a medium for the noradrenaline.

As a result of the emergency treatment the patient's blood pressure became recordable (50/30–90/60). The pulse, when detectable, varied between 108 and 136. Throughout the first 24 hours the patient remained comatose and flushed. A trickle of blood continued from the vagina.

Over the succeeding 48 hours her blood pressure was maintained at about 60 mm. systolic by continued intravenous noradrenaline. There was oliguria, the urine containing red blood cells and albumen. Towards the end of the second day after admission there was a slight but gradual improvement in the patient's general level of consciousness. The erythema gave way to a rapidly deepening jaundice and widespread petechial haemorrhages occurred all over the body. Vitamin K was given. There was further improvement the next day with a good urinary output (2,130 ml.). On recovering consciousness she complained of deafness. Streptomycin was therefore stopped and Terramycin 250 mg. 6-hourly substituted. On the fourth day after admission the intravenous noradrenaline therapy was stopped as the blood pressure remained steady at 110/70. Thereafter, there was a marked diuresis. Jaundice and petechiae persisted for 2 weeks. The patient was discharged from hospital on 5th February, fully recovered.

Unfortunately when the blood transfusion was dismantled at the patient's home before admission to hospital, the bottles and tubing were washed out. Bacteriological study of the bottles revealed no evidence of infection. The characteristic onset of a profound condition of shock associated with an equally profound toxic erythema developing during blood transfusion, suggested the diagnosis of transfusion of infected blood. Bacteraemia was confirmed by a heavy growth of *Bact. coli* from the blood culture, reactions of which are reported in the Addendum to this paper.

DISCUSSION

Transfusion reactions from contamination of stored blood are fortunately rare. They were reported during the second world war (Strumia and McGraw, 1941; Officer, 1942; Whitby, 1942). Stevens *et al.* (1953) reviewed 41 cases from the literature and their own experience. They describe the condition noted in Case 2 of severe hypotension with contrasting intense erythema and warm extremities as a character-

istic syndrome which they labelled "red shock". In their series the mortality was 60 per cent. Pittman (1953) adds a further 16 cases, 9 of which were fatal. A review of 35 cases of shock associated with bacteraemia is reported by Hall and Gold (1955) from a series of 100 patients with bacteraemia. The most frequent sources of the bacteraemia were the genito-urinary tract, peritonitis, cutaneous suppuration, the biliary tract, and lobar pneumonia. Where the condition of the skin was noted, less than half the patients had a warm flushed skin. The shock was thought to be due to bacterial endotoxins. Reports in the English literature seem to be confined to medico-legal cases (*British Medical Journal*, 1952; *Lancet*, 1953), although recently Lane (1955) described a maternal death from *Bact. coli* septicaemia associated with post-partum haemorrhage.

Braude *et al.* (1953) successfully treated a case with antibiotics, cortisone and noradrenaline. Hausmann and Lunt (1955) point out that severe shock and extensive tissue reaction with a warm skin suggest acute adrenal insufficiency. Intravenous transfusion of noradrenaline in large amounts may be life-saving in such cases. Wise, Shaffer and Spink (1952) have given as much as 136 mg. daily. But the most important treatment is the use of effective antibiotics.

Another feature of interest in Case 2 was the fact that blood withdrawn from a vein failed to clot. Afibrinogenaemia which is a recognized complication of certain conditions associated with pregnancy has been described in severe infection (McKay *et al.*, 1953; Jackson, Hartmann and Busby, 1955).

SUMMARY

Two cases are presented of profound shock associated with labour in which a common factor was *Bact. coli* bacteraemia. In the first case the infection was acquired during surgical induction of labour, and in the second as the result of an infected blood transfusion.

It is suggested that in view of the satisfactory response to vigorous treatment this rare, but dangerous, condition should be borne in mind in cases of unexplained shock.

ADDENDUM

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The coliform bacillus, reference no. 742/55, was isolated from a blood culture taken after transfusion of Case 2. The organism is an irregular type of *Bact. coli*, with some atypical features.

Sera from the patient taken on the sixth and fourteenth day of illness were tested for agglutinating antibodies with alcoholized ("O") and formalin treated ("H") suspensions of organism 742/55. Rising "O" and "H" antibody titres were demonstrated (see Table).

TABLE I

Antigen	Antibody Titres	
	6th Day of Illness	14th Day of Illness
"O"	1 in 800	1 in 3,200
"H"	1 in 400	1 in 6,000

A guinea pig, subcutaneously inoculated with 500 million organisms died after 36 hours. At post-mortem there was intensive haemorrhagic oedema of the tissues at the site of inoculation and a diffuse generalized red haemorrhagic congestion of the subcutaneous tissues.

More recently the following additional case has come to our notice. We are indebted to Mr. R. G. Maliphant for permission to publish the details.

Mrs. D.N., a primigravida, aged 32, was admitted to hospital as an emergency in labour on 21st November, 1954. She was transferred from another hospital because she had collapsed in labour. She had been given an oil-bath-enema induction of labour on 16th November, being two weeks overdue. Labour commenced at 2 a.m. on 17th November. The following night at 10 p.m. the membranes ruptured. The liquor was meconium stained. Contractions continued, ranging in intensity and frequency for the next 2 days. During this time the patient's pulse was rapid and she had a pyrexia varying between 99.4 and 102.6. At 3.20 a.m. on 21st November she had a rigor and collapsed. An intravenous transfusion was set up: 2 pints of dextrose saline, 2 pints of Dextran and $\frac{1}{4}$ pint of blood were given. After the transfusion she developed pulmonary oedema and cyanosis.

At the time of transfer to Mr. Maliphant's care she had been in labour for 108 hours. She was dyspnoeic and cyanosed. Her pulse rate was 130, temperature 97° and blood pressure 60/35. The uterus was tense but not tender. There was a contraction ring palpable. The abdomen was distended. There was no urine in the bladder and none had been passed for 12 hours. Vaginal examination revealed a thick rim of cervix all round the vertex. There was no disproportion. Much thick blood-stained meconium escaped during the examination.

A diagnosis of uterine dysfunction, intra-partum infection and suprarenal insufficiency was made. Treatment included Terramycin, Eucortone, and oxygen. The following day there was little change. Penicillin therapy was given in addition and the Bull Borst regime was instituted. At 6 p.m. a general anaesthetic was given. The foetal head was perforated, a cephalotribe was applied and the crushed head was delivered after amyl nitrite had been given. Following cleidotomy, the foetal body was extracted through the constriction ring. The perineum was repaired. As there was a trickle of blood from the uterus the vagina was packed. The patient's blood pressure could not be recorded. Methedrine was administered and a blood transfusion was started. On catheterization, 1½ ounces of bloodstained urine was obtained.

Post-mortem of the infant showed gas bubbles in the abdominal wall and lungs. There was an offensive exudate in the peritoneal cavity. The patient was therefore given anti-gas gangrene serum.

On 23rd November the patient was very ill and irrational. A Levophed drip transfusion was instituted in view of the peripheral circulatory failure. Paraldehyde was used for sedation. The response to the noradrenaline drip was not marked although the urinary output was good (26 ounces). In the early hours of 24th November the patient was thought to be dying but she rallied and gradually improved. She developed hiccoughs and had faecal incontinence. Over the succeeding days the improvement was maintained. She was discharged home fit on 18th December.

The report on the Blood Culture which was taken at the first hospital was received on 25th November—*Bact. coli* grown.

COMMENT

The positive blood culture and clinical details leave no doubt in the opinion of the authors that this case represents a further example of obstetric shock due to *Bact. coli* bacteraemia. In this case the avenue of infection was apparently uterine, although it is obscure how such uterine infection arose.

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