

Isolation of *Pseudomonas pseudoalcaligenes* from an Infection of a Pregnant Uterus

WILLIAM J. LEDGER, M.D., AND JOHN T. HEADINGTON, M.D.

INFECTIONS OF the pregnant uterus are a source of concern to clinicians because of the possibility of a maternal death attributable to sepsis. Many therapeutic decisions are based upon the bacteriologic findings in individual cases. In the care of such a patient recently we recovered an organism, *Pseudomonas pseudoalcaligenes*, a gram-negative aerobe, that to our knowledge has not been previously reported in a human pelvic infection. In order to alert physicians to the characteristics of this organism, this case study is reported.

CASE REPORT

L. P., a 17-year-old primigravida at 22 weeks gestation, was admitted febrile, in active labor. Her clinical course is graphically illustrated in Figure 1. She was given intravenous penicillin and intramuscular kanamycin and, at Point 1 in Figure 1, delivered a stillborn fetus. The presence of gas in the uterine wall on roentgen examination of the abdomen and a deteriorating clinical picture led to laparotomy at Point 2, where a total abdominal hysterectomy and bilateral salpingo-oophorectomy was performed. The organisms recovered prior to operation and at the time of operation are noted in Table 1. Postoperatively, her urine output continued to fall and at Point 3, the decision was made to begin hemodialysis. In the presence of renal failure, the dosage of penicillin and kanamycin was

reduced. With the persisting fever post-operatively and the lack of definitive pelvic findings, a diagnosis of septic pelvic thrombophlebitis was made at Point 4 and intravenous heparin was added to the treatment regimen. At Point 5, an infected vaginal hematoma was drained, and the culture results are noted in Table 1. At Point 6, the seventh and last hemodialysis was carried out and at Point 7, the patient became afebrile and remained so for the rest of her hospital stay.

DISCUSSION

The spectrum of organisms recovered from the infected tissue of this patient illustrates the importance of utilizing bacteriologic technics that will assure the recovery of anaerobic as well as aerobic organisms (See Table 1). In this case, specimens were incubated immediately in fresh thioglycolate broth. The use of thioglycolate usually enhances recovery of anaerobic organisms. However, on occasion, fastidious anaerobic species may be overgrown by vigorous aerobes and direct isolation on solid media may be required. In addition to the anaerobes of *Clostridium* species and the microaerophilic streptococcus recovered from this patient, recent reports have also stressed the frequency with which *Bacteroides* species can be recovered from patients with an infected abortion.^{4, 6} Thioglycolate does not preclude the recovery of aerobes, for in this case, *Pseudomonas pseudoalcaligenes*, a gram-negative aerobe, was recovered in mixed culture.

Pseudomonas alcaligenes has been reported in blood, pus, urine, feces, and the respiratory tract of humans, but not to our knowledge in the female reproductive

From the Departments of Obstetrics and Gynecology and of Pathology, University of Michigan Medical Center, Ann Arbor, Mich. 48104.

Address requests for reprints to: Dr. W. Ledger, Department of Obstetrics and Gynecology, University of Michigan Medical Center, Ann Arbor, Mich. 48104.

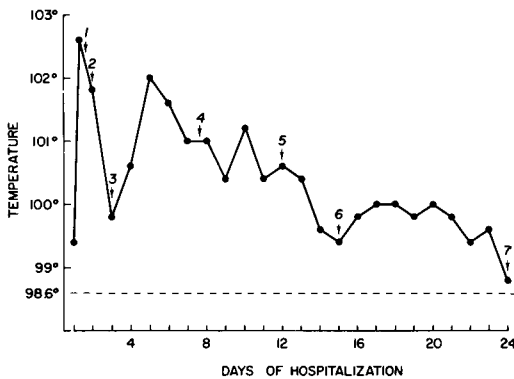


FIG. 1. See text.

TABLE 1
Bacteria Recovered from Patient

Source	Organisms
Admission blood cultures	<i>Clostridium perfringens</i> <i>Clostridium fallax</i> <i>Clostridium sphenoides</i> Microaerophilic streptococci
Cultures obtained at time of operation	
Endometrial curettings	<i>Pseudomonas pseudoalcaligenes</i>
Peritoneal fluid	<i>Clostridium perfringens</i> <i>Clostridium sporogenes</i>
Uterine wall	<i>Clostridium perfringens</i> <i>Clostridium fallax</i> <i>Pseudomonas pseudoalcaligenes</i>
Ovarian abscess	<i>Clostridium sphenoides</i>
Blood	<i>Clostridium perfringens</i> <i>Clostridium sphenoides</i> <i>Clostridium fallax</i>
Culture from vaginal cuff on drainage of hematoma, Day 12	<i>Clostridium perfringens</i> <i>Escherichia coli</i> <i>Streptococcus faecalis</i> Diphtheroids

tract. Two biotypes of *Pseudomonas alcaligenes*, A and B, have been described. Biotype B appears to correspond to *Pseudomonas pseudoalcaligenes*, the most important differing characteristic of the strain tested being growth at 42 C.⁷ Hugh³ would prefer the alternative designation of *Pseudomonas alcaligenes*, Biotype B.

This patient's case report illustrates an aggressive therapeutic approach to infections of the pregnant uterus. On our service, we usually use large doses of bactericidal antibiotics such as penicillin and kanamycin combined with early operative removal of infected tissue. In general, our major clinical concerns have been infections attributable to gram-negative aerobic path-

ogens, such as *Escherichia coli*, with their potential for endotoxic shock, or infections associated with gram-positive anaerobes, such as the *Clostridium* species, with the potential for intravascular hemolysis and death.

The clinical significance of the organism *Pseudomonas pseudoalcaligenes* is not known. A recent report of the nonfermentative gram-negative bacilli of nosocomial interest cited 26 isolations of *Alcaligenes* species.² The *Alcaligenes* was not considered to be a pathogen in any case, for the organism was not recovered from a site of serious infection in these 26 instances. Our case differed from this, for the *Pseudomonas pseudoalcaligenes* were recovered from the uterine tissue of a patient with a septic abortion. In our patient, we believe that clostridia were the major pathogens because of the recovery of these organisms from the blood, the peritoneal cavity, and the uterine wall (see Table 1) and the clinical picture of intravascular hemolysis with acute renal failure. However, *Pseudomonas pseudoalcaligenes*, a gram-negative aerobe, was also recovered from the pelvic tissues of a critically ill patient. This may be only an isolated bacteriologic curiosity, but current infectious disease literature is replete with studies documenting a changing spectrum of bacteria in human infection. Perhaps the best example is *Serratia marcescens*, once considered a harmless contaminant but now recognized as a significant pathogen in human infections.¹ In addition, there are many examples of the synergistic role of combinations of bacteria in certain infections, combinations that complicate the therapy in many instances.⁵ Further observations will be needed before the role of this unusual *Pseudomonas* in human pelvic infections is established. It is the purpose of this paper to alert obstetricians and gynecologists to this possibility.

RESUME

Les accidents septiques maternels sont toujours d'actualité, en raison du risque de mort qu'ils comportent.

Voici l'observation d'une infection d'un utérus gravide, où l'on rencontra à côté du perfrin-

gens un germe inhabituel: *Pseudomonas pseudoalcaligenes*. Cette primipare de 17 ans, au terme de 22 semaines, est hospitalisée fébrile, en travail. Elle accouche d'un enfant mort-né. En raison de la constatation de gaz dans la paroi utérine à la radio et de l'aggravation de l'état clinique, on pratique une hystérectomie totale sans conservation. Une oligurie extrême conduit à une dialyse. La persistance de la fièvre, sans localisation pelvienne, fait faire le diagnostic de thrombophlébite pelvienne et administrer de l'héparine.

Puis un hématome vaginal infecté est évacué. Après la septième dialyse, la fièvre disparaît et la malade guérit.

L'enquête bactériologique utilisa des techniques adaptées aussi bien aux germes anaérobies qu'aérobies. Il semble que ce soit la première fois que l'on ait trouvé du *Pseudomonas pseudoalcaligenes* (ou *Pseudomonas alcaligenes*, type B) dans une infection génitale.

Mais dans cette observation, le germe pathogène majeur fut le *perfringens* responsable certainement de l'hémolyse et des complications rénales.

Il est difficile de préciser quelle part fut celle du *Pseudomonas*, mais on connaît d'autres cas où des germes supposés saprophytes furent

secondairement reconnus pathogènes. Une action synergique de plusieurs germes peut également être envisagée. C'est la raison pour laquelle la présence de celui-ci a été rapportée.—C. SUREAU

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