Empyema of the gallbladder due to *Haemophilus parahaemolyticus*, with a brief review of its role as a pathogen

MICHAEL PARSONS AND IRWIN FARIS

From the Department of Bacteriology and Department of Surgical Studies, Middlesex Hospital Medical School, London

SYNOPSIS A case of empyema of the gallbladder caused by *Haemophilus parahaemolyticus* is reported. This is believed to be the first report of such an infection. The literature relating to pathogenicity of this organism is reviewed.

It used to be thought that apart from *Haemophilus influenzae* organisms of the *Haemophilus* group were only rarely pathogenic to man. But this idea has been revised. For example, *Haemophilus parainfluenzae* has been found to be a cause of meningitis, endocarditis, and occasionally of other infections (Sanders, Russell, and Gilliam, 1968; Gordon and Love, 1970; Hable, Logan, and Washington, 1971), and since the first account of *Haemophilus aphrophilus* (Khairat, 1940) it has become recognized as a cause of endocarditis and brain abscess (Spellner, Prout, and Saunders, 1968). Nevertheless it remains true that the organisms of this group other than *H. influenzae* command little attention as possible pathogens. In particular the haemolytic varieties tend to be discounted (Turk and May, 1967).

We report here a case of empyema of the gallbladder due to *H. parahaemolyticus*.

Case Report

A 40-year-old policeman was admitted for elective cholecystectomy following two attacks of pain beneath the right costal margin. He had previously been in good health apart from an attack of enteric fever 20 years before. Oral cholecystography showed a common bile duct of normal calibre but no filling of the gallbladder.

At operation the gallbladder was embedded in the liver. While being freed it was inadvertently ruptured and thick pus escaped. This was immediately aspirated into a syringe and sent for culture. There were stones in the gallbladder but none in the common duct.

His subsequent course was uneventful and he was discharged on the eleventh postoperative day.

Received for publication 31 May 1973.

Laboratory Findings

Gram staining of the pus showed many small pleomorphic Gram-negative rods. The bile was cultured aerobically and anaerobically on Columbia agar (Oxoid) with 5% horse blood added. After 18 hours' incubation it produced a pure growth of small grey beta-haemolytic colonies which were facultatively anaerobic. Growth was not improved in an atmosphere of 10% CO₂. There was no growth on CLED medium (Oxoid) or nutrient agar (Oxoid). The colonies consisted of Gram-negative rods resembling those already seen. A viable count (Miles and Misra) performed within three hours of operation showed 5×10^6 organisms/ml of bile. On nutrient agar (Oxoid) there was abundant growth round discs containing V and X + V factors (Mast) but none around that containing X factor only. This was repeated on subculture from around the V factor disc. The organism was non-motile, indole negative, and reduced nitrates. It was therefore considered to be *H. parahaemolyticus*. (We are grateful to Mr L. R. Hill of the National Collection of Type Cultures for confirming the identification.) Because of the history of enteric fever the bile was cultured in Selenite F and on DCA (Oxoid) but no salmonella or other organism was isolated.

Histology of the gallbladder showed marked inflammatory thickening of the wall, with gross muscle hypertrophy and intramural diverticula. The stones were of cholesterol.

Discussion

The existence of *Haemophilus* bacteria which are haemolytic on blood agar and require V but not X as

growth factor was known before 1953 but it was then that Pittman proposed the name *H. parahaemolyticus*, by which they have since been known (Pittman, 1953). She said then: 'The bacteria are associated frequently with acute pharyngitis and occasionally cause subacute endocarditis.' But in fact there is little firm information about their status as pathogens.

Lichty (1937) described subacute bacterial endocarditis in a 14-year-old boy due to an haemolytic *Haemophilus* organism which required V but not X factor. However in a brief review of *Haemophilus* endocarditis Gordon and Love (1970) mention no cases due to *H. parahaemolyticus*, nor have we found any others.

In a study of 100 patients with sore throat, Branson (1968) found *H. parahaemolyticus* in 30 of them, but she also found it in 18% of controls. Moreover Sims (1970) reports isolating it from just under one third of all oral clinical specimens, so its significance in this respect is hard to assess.

Apart from these the only reported example of *H. parahaemolyticus* as a pathogen appears to be the case of Hable *et al* (1971) in which it caused periorbital septicaemia and cellulitis in a 1-year-old baby.

The present case is interesting both for the organism and for its presence in this site. Organisms cultured from the bile are usually Gram-negative intestinal bacteria or streptococci, with occasional staphylococci. In three series (Scott and Khan, 1967; Flemma, Flint, Osterhout, and Shingleton, 1967; Robson, Bogart, and Heggors, 1970) in which positive cultures were obtained from 98 patients in all, no haemophili were found. They may rarely be isolated from the digestive tract and occasionally are pathogenic there. Branson (1967) reports a case of *H. influenzae* appendicitis, with references to others, and mentions the isolation of *H. parainfluenzae* from an appendix.

How the organism reached this patient's gallbladder is not certain. There may have been a transient bacteraemia, as is known with other upper respiratory tract commensals, and the bacteria came through the gallbladder wall. This would be in accord with the current theory that bacteria in the bile tend to get there from the bloodstream through the wall rather than by ascending from the gut

(Scott, 1971). But culture of the wall after washing in Ringer's solution and homogenizing yielded no growth in this case, so the organism may have originated in the gut.

As mentioned, there have been very few previous reports of *H. parahaemolyticus* as a pathogen and none of it as a pyogenic organism. This is probably due to failure both to isolate it and to appreciate its significance once isolated. Culture must be on a medium which supports its growth, with a selective technique such as a V factor disc to enhance it. Haemolysis must be sought using horse or rabbit blood; human and sheep blood inhibit growth of haemolytic haemophili (Branson, 1968). Furthermore, the attitude which dismisses the organism when isolated as merely a commensal should be revised on the evidence of this and the other cases quoted.

We are grateful to Professor L. P. LeQuesne under whose care the patient was for permission to report this case.

References

- Branson, D. (1967). Isolation of *Haemophilus influenzae* from appendix and incision. *Amer. J. clin. Path.*, **47**, 643-645.
- Branson, D. (1968). Bacteriology and clinical significance of hemolytic *Haemophilus* in the throat. *Appl. Microbiol.*, **16**, 256-259.
- Flemma, R. J., Flint, L. M., Osterhout, S., and Shingleton, W. W. (1967). Bacteriologic studies of biliary tract infection. *Ann. Surg.*, **166**, 563-572.
- Gordon, A. M., and Love, W. C. (1970). Endocarditis due to *Haemophilus parainfluenzae*. *J. med. Microbiol.*, **3**, 550-554.
- Hable, K. A., Logan, G. B., and Washington, J. A., II (1971). Three *Haemophilus* species: pathogenic activity. *Amer. J. Dis. Child.*, **121**, 35-37.
- Khairat, O. (1940). Endocarditis due to a new species of *Haemophilus*. *J. Path. Bact.*, **50**, 497-505.
- Lichty, J. A., Jr. (1937). Subacute bacterial endocarditis due to a hemolytic para-influenza bacillus. *Amer. J. Dis. Child.*, **54**, 1311-1319.
- Pittman, M. (1953). A classification of the hemolytic bacteria of the genus *Haemophilus*. *J. Bact.*, **65**, 750-751.
- Robson, M. C., Bogart, J. N., and Heggors, J. P. (1970). An endogenous source for wound infections based on quantitative bacteriology of the biliary tract. *Surgery*, **68**, 471-476.
- Sanders, D. Y., Russell, D. A., and Gilliam, C. F. (1968). Isolation of *Haemophilus* species from abscesses in two children. *Pediatrics*, **42**, 683-684.
- Scott, A. J. (1971). Bacteria and disease of the biliary tract. *Gut*, **12**, 487-492.
- Scott, A. J., and Khan, G. A. (1967). Origin of bacteria in bile duct bile. *Lancet*, **2**, 790-792.
- Sims, W. (1970). Oral *Haemophili*. *J. med. Microbiol.*, **3**, 615-625.
- Speller, D. C. E., Prout, B. J., and Saunders, C. F. (1968). Subacute bacterial endocarditis caused by a micro organism resembling *Haemophilus aphrophilus*. *J. Path. Bact.*, **95**, 191-198.
- Turk, D. C., and May, J. R. (1967). *Haemophilus influenzae: Its Clinical Importance*. English Universities Press, London. p. 12.