Unusual Coiled Gram-Positive Anaerobe Isolated from a Gutter Wall Abscess

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A gram-positive, nonsporing coiled rod was visible on Gram stain and isolated in pure culture from 20 ml of pus. This organism differs from previously described species in that it produces only acetic acid from glucose metabolism, hydrolyzes esculin, and has less fermentative activity in carbohydrates.

Intra-abdominal abscesses are usually preceded by an abdominal operation or an accidental perforation of the abdominal cavity by a penetrative object (3, 4). The organisms involved frequently consist of those found in the intestinal tract and include anaerobic gram-negative bacilli and gram-positive cocci. Anaerobic, nonsporing gram-positive rods, although described as part of the intestinal contents, are not frequently isolated in pure culture in obvious pathological processes (3, 5). Here, we describe an unusual anaerobic gram-positive rod, which morphologically resembles *Clostridium ramosum* but is biochemically distinct. It was isolated in pure culture from an intra-abdominal abscess that formed after repair of a gunshot wound.

A 39-year-old Caucasian male was admitted to Harborview Medical Center on 4 July 1975 with a gunshot wound to the abdomen made by a 0.22-caliber (ca. 1.0 cm in diameter) bullet. There were lacerations to the liver, small bowel, stomach, and transverse colon, which were repaired at surgery. The patient was discharged on 21 July 1977, to be followed in clinic. Two months later, the patient came to the hospital with symptoms of obstruction near the site of the original colostomy. The patient was afebrile, generally healthy, and showed a mucous fistula in a midline scar and a questionable mass in the left lower quadrant. On surgery, an abscess was found in the left gutter wall, from which 20 ml of creamy pus was removed. The abscess cavity appeared to have formed from a probable leak at the area of the gunshot wound. Pus obtained from the abscess was delivered to the laboratory in a syringe. It was cultured on blood agar base (Baltimore Biological Laboratory [BBL]) with 5% sheep blood and MacConkey agar aerobically, on brucella agar (BBL) with 5% sheep blood and vitamin K with hemin (10) anaerobically, and in thioglycolate broth (BBL). The primary Gram stain showed a moderate number

of coiled gram-positive rods and polymorphonuclear leukocytes (Fig. 1). A pure culture of this organism showed coiled, curved, and S-shaped forms on Gram stain similar to those described for *C. ramosum* (6).

The isolate was indole negative, failed to reduce nitrates to nitrites, and did not produce acid in fructose, glucose, sucrose, mannitol, maltose, xylose, raffinose, arabinose, or lactose in either thioglycolate base with yeast extract and bromothymol blue (2) or from any carbohydrates in an API 20A strip (Analytab Products, Inc.). However, there was weak acid production detected when pH was measured from pre-reduced peptone-yeast extract base at the Wadsworth Anaerobe Laboratory. Moore et al. described several strains of *Eubacterium* spp. that failed to produce acid in thioglycolate and API media but did so in peptone-yeast extract base, using pH measurement as the final criterion (7). Only an acetic acid peak was detected by gas-liquid chromatography. Comparisons of reactions with those of previously described coiled species are given in Table 1. The isolate was very susceptible to penicillin, tetracycline, chloramphenicol, cephalothin, and carbenicillin and was indeterminately susceptible to clindamycin.

As a rule, *Eubacterium* species, which are frequently part of the normal fecal flora, appear in culture mixed with other anaerobic and aerobic flora (1, 3-5). Only rarely have they been cultured as the sole isolate from a clinical specimen (9). The organism described herein appears to be the etiological agent in the described abscess, since it was readily visible on primary Gram stain together with neutrophils, and a large amount of pus was produced, indicating an inflammatory process.

Although the isolate morphologically resembles *C. ramosum*, it is clearly distinguishable from that species on the bases of gas-liquid chromatography and biochemical reactions (Ta-

FIG. 1. Primary Gram stain of pus from a gutter wall abscess, showing coiled organisms. $\times 1,000$.

TABLE 1. Comparison of the biochemical reactions of the coiled clinical isolate *Eubacterium* (UW) with other described coiled species

Character	<i>C. ramosum</i> (6), VPI ^a	<i>Eubacterium</i> -AQ (8), VPI	Gram-positive coiled rod		
			CDC	API	VPI
Acid from: ^b					
Glucose	A	W	—	—	W
Lactose	A	—	—	—	A
Maltose	A	—	—	—	—
Mannitol	A	—	—	—	—
Raffinose	W	—	—	—	—
Rhamnose	V	W	—	—	—
Salicin	W	—	—	—	W
Sucrose	A	—	—	—	A
Xylose	—	—	—	—	—
Starch	—	—	—	—	—
Esculin hydrolyzed	+	—	+	+	+
Coiled	+	+		+	
Gas-liquid chromatography ^c	ALF	ALs2		A	
Catalase	—	—		—	

^a Fermentation media: VPI, Virginia Polytechnic Institute; CDC, Center for Disease Control; API, Analytab Products, Inc.

^b Abbreviations: (A) strong (pH <5.5), (W) weak, or (V) variable production.

^c Abbreviations: (A) acetic, (L) lactic, (F) formic acid, or (S) succinic acids; (2) alcohol.

ble 1). Many isolates similar to this strain have been isolated from normal feces processed at the Wadsworth Anaerobe Laboratory, but not from clinical specimens (P. T. Sugihara, V. L. Sutter, K. S. Bricknell, and S. M. Finegold, Abstr. Annu. Meet. Am. Soc. Microbiol. 1977, C146, p. 59). These workers agree that these isolates are all probably *Eubacterium* spp. Moore and Holdeman described another coiled species from normal fecal flora, which they called *Eubacterium*-AQ (8). It differs from our isolate in that it fails to hydrolyze esculin and is less active in fermenting carbohydrates.

It appears that there are a variety of strains that morphologically resemble *C. ramosum*, are biologically distinct, are part of the normal fecal flora, and are rarely involved in pathological processes. Animal models may shed some light on special properties of this isolate that may allow it to contribute to abscess production.

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