Title: *Streptococcus bovis* meningitis and haemorrhoids

Running title: Strep Bovis meningitis and haemorrhoids

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Abstract

We report a case of Streptococcus bovis (Streptococcus gallolyticus subsp. pasteurianus) meningitis, a rare cause of CNS infection in an adult, and comment on the importance of investigation of the lower gastro-intestinal tract to identify a portal of entry in cases of systemic Streptococcus bovis infection.
A previously fit 61 year-old woman presented to the hospital Accident and Emergency Department with a two-day history of headache and malaise. Her headache had become rapidly more intense in the hours preceding admission, waking her from sleep, and was associated with severe neck stiffness, nausea and vomiting.

On examination she was febrile (38.9°C), tachycardic (heart rate 110 bpm), was clinically mildly dehydrated, drowsy, but orientated, and had marked meningism. There was no rash. There was no focal neurological abnormality and fundoscopy was normal. Peripheral blood samples, including cultures, were taken and treatment with intravenous ceftriaxone, aciclovir and fluids was started. Urgent brain CT scanning was normal. A fall in the patient’s blood pressure to 90/55 mmHg prompted her transfer to the hospital’s High Dependency Unit, where a lumbar puncture was performed.

Investigations revealed a peripheral blood white cell count of 11.1x10⁹/L (normal range (NR) 4-10.5x10⁹/L), neutrophils 9.9x10⁹/L (NR 1.7-7.5x10⁹/L) and a C-reactive protein of 114mg/L (NR <5mg/L). Coagulation and routine serum biochemical screens including liver function tests were normal apart from a mildly prolonged activated partial thromboplastin time (APPT) of 46 sec. (NR 22-36 sec.) and an albumin of 32 g/L (35-50g/L). The cerebrospinal fluid (CSF) protein level was 4.02 g/L (NR 0.15-0.45 g/L) and glucose was 2.8 mmol/L. Unfortunately, no paired serum glucose sample was received in the
laboratory. The CSF white cell count was 1000/mm$^3$ (100% neutrophils) and
the red cell count was 250/mm$^3$. Microscopy revealed the presence of
intracellular Gram+ cocci. CSF and peripheral blood cultures were positive for
the same Gram+ coccus, identified as *Streptococcus bovis* by the API 32
Strep profile (Biomérieux, Marcy l’Étoile, France). The isolate was further sub-
speciated by partial sequencing of 16S rRNA (Health Protection Agency,
Centre for Infections, Colindale, London, UK) as *Streptococcus bovis biotype
II/2 (Streptococcus galloyticus subsp. pasteurianus)* (2). The isolate, proved
sensitive to a wide range of antibiotics, including benzylpenicillin (minimum
inhibitory concentration (MIC) 0.094mg/L), ceftriaxone (MIC 0.19mg/L),
amoxicillin, tetracycline, and vancomycin. Further examination of the patient
revealed no evidence of other focal sepsis or of endocarditis. Trans-
oesophageal echocardiography was normal. Treatment with i.v. ceftriaxone 2g
twice daily was continued for 10 days. Aciclovir was discontinued.

Further questioning revealed that the patient’s periodically painful
haemorrhoids had become more symptomatic over the previous two weeks,
associated with intermittent low-level PR blood loss on defecation, on a
background of longstanding constipation. There had been no recent change in
bowel habit or other abdominal symptoms, no weight loss, and no systemic
symptoms prior to the onset of headache.

In view of the well-documented association between *S. bovis* bacteraemia and
colonic pathology, particularly neoplasms, which serve as a portal of entry,
investigation of the large intestine was undertaken. Inspection and
proctoscopy confirmed congested haemorrhoids with a small healing area of superficial ulceration, which was not swabbed. No local collection or abscess was visible. Flexible sigmoidoscopy demonstrated no rectal or sigmoid colonic lesion and a CT pneumocolon revealed no mucosal lesion in the rest of the large bowel.

Our patient made an excellent recovery complicated only by a mild unilateral 7th cranial nerve palsy, which had nearly completely resolved on review three months later. Her haemorrhoids were treated conservatively with stool softeners and advice on the management of her constipation.

Streptococcus bovis (Group D non-enterococcal streptococci) has been shown to be a normal inhabitant of the intestinal tract in 5% to 10% of adults (4,7). It is responsible for a range of clinical presentations, including endocarditis, where it is the causative organism in between 7% - 14% of cases (9), bacteraemia, urinary tract infection, endophthalmitis and septic arthritis. Streptococcus bovis is a recognised but rare cause of meningitis in children, seen most commonly as a complication of systemic sepsis in neonates, and is even rarer in adults (10). First reported in 1975 (5), only 19 cases have been documented in adults, in the English literature.

There is a strong relationship between Streptococcus bovis infection and bowel disease. Colonic carcinoma has been reported in up to 50% of patients with streptococcus endocarditis or bacteraemia (1,6,8,11). Other colonic
conditions have also been described in conjunction with a *Streptococcus bovis* infection including inflammatory colitis, polyps and diverticulosis. In the 19 reported cases of *Streptococcus bovis* meningitis, investigation of the gastrointestinal tract has revealed a range of large bowel pathology including diverticulae, and in one case no underlying lesions (10). In our patient, it is likely that a bleeding ulcerated haemorrhoid provided a direct pathway for haematogenous dissemination of the organism.

*Streptococcus bovis* remains the designation in routine clinical use, but phenotypic and molecular genetic techniques now allow the subdivision of *Streptococcus bovis* into *Streptococcus galolyticus* and *Streptococcus infantarius* and their subspecies. In a recent study (2) of *Streptococcus bovis* blood culture isolates from 58 consecutive patients, which were further characterised by 16S rRNA sequencing, none of the 29% of isolates typed as *Streptococcus galolyticus* subsp. *pasteurianus* was associated with endocarditis or with identified benign or malignant colonic disease, though numbers were too small to draw meaningful conclusions about potential subspecies-specific disease associations. In contrast to previous series, colonic carcinoma was identified in only 3 of the 58 affected patients, but 30 had hepato-biliary disease.

Our case illustrates an unusual complication of haemorrhoids and establishes *Streptococcus galolyticus* subsp. *pasteurianus* as a potential, if rare, cause of meningitis in previously fit adult patients. No malignant or pre-malignant large bowel lesion was found in our patient, but the link between colonic pathology...
and bacterial dissemination makes investigation of the lower GI tract mandatory in patients with *S. bovis* bacteraemia or distant focal infection (3).
References


