Case report

Ascending cholangitis presenting with *Lactococcus lactis cremoris* bacteraemia: a case report

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Abstract

**Introduction:** A case of *Lactococcus lactis cremoris* causing cholangitis is described. This Gram-positive organism is not routinely considered to be pathogenic in immunocompetent individuals. To our knowledge, this is the thirteenth report of invasive infection and the first of cholangitis to be reported in association with this organism.

**Case presentation:** A 72-year-old patient presented with Charcot’s triad and was demonstrated to have cholangitis with *Lactococcus lactis cremoris* bacteraemia. Biliary drainage was achieved through endoscopic retrograde cholangiography. Antibiotic therapy with multiple agents was necessary.

**Conclusion:** This report provides corroboration of evidence that *Lactococcus lactis cremoris* is a potential pathogen in immunocompetent adults. There remains a debate about the most appropriate empirical antibiotic therapy in this condition. In the light of this case, it is important to keep an open mind to potential pathogens.

Introduction

*Lactococcus lactis cremoris* is commonly considered to be a non-pathogenic organism in humans. It is recognized as a commensal organism of mucocutaneous surfaces, however, over the past 50 years, there have been a number of case reports [1-11] demonstrating the potential for this organism to cause infection. We report the first case of cholangitis associated with septicaemia caused by *Lactococcus lactis cremoris*.

Case presentation

A 72-year-old lady, normally fit and well, presented with a 5-day history of jaundice and abdominal pain. She was nauseated and had dark urine. On initial assessment, she was deeply icteric and her temperature was 38.2°C but she was haemodynamically stable. Systemic examination did not reveal any other abnormalities, specifically there were no stigmata of chronic liver disease. No organs or lymph nodes were palpable and the abdomen was soft and non-tender.

Biochemical analyses demonstrated a leukocytosis and neutrophilia; haemoglobin (Hb) 11.9 g/dL, white blood cell count (WCC) 13.9 × 10⁹/L, neutrophils 11.4 × 10⁹/L. An acute phase response was evident with C-reactive protein (CRP) 131 mg/L. A mixed cholestatic and hepatic pic-
ture of hepatic enzymes with alkaline phosphatase (ALP) 340 U/L, alanine aminotransferase (ALT) 240 U/L and gamma-glutamyl-transferase (γGT) 381 U/L was demonstrated; total bilirubin was 351 μmol/L. Hepatic synthetic function was preserved with albumin 30 g/L and prothrombin time (PT) of 13.8 seconds. A clinical diagnosis of cholangitis was made on the basis of Charcot’s triad (abdominal pain, fever and jaundice), and empirical antibiotic therapy (oral ciprofloxacin 500 mg bd) was commenced.

An ultrasound of the biliary tree was performed demonstrating dilatation of the common bile duct to 1.5 cm with visualization of at least one stone in the lumen of the duct. Intrahepatic duct dilatation was also noted. Blood cultures confirmed a *Lactococcus lactis cremoris* septicaemia. The organism was sensitive to tazobactam/piperacillin and co-amoxiclav. In light of these results, antibiotic therapy was changed to intravenous tazobactam/piperacillin 4.5 g tds.

The patient proceeded to endoscopic retrograde cholangiopancreatogram (ERCP) where an impacted common bile duct stone was identified. Unfortunately, this was not amenable to endoscopic removal despite sphincterotomy; however two biliary stents were inserted with good drainage.

The patient recovered rapidly with resolution of her symptoms and signs and was discharged home 48 hours post-ERCP. Treatment was completed with 2 weeks of oral co-amoxiclav 625 mg tds.

**Discussion**

The Tokyo Consensus guidelines of 2007 have now established definitive diagnostic criteria and severity assessment of cholangitis [12]. The diagnosis of cholangitis is made either by the presence of Charcot’s triad or by the presence of two of these features backed up by abnormal liver function tests, raised inflammatory markers and imaging demonstrating a dilated biliary tree. Severity is assessed by the presence or absence of organ failure once a diagnosis has been made and response to initial therapy. As our patient had no signs of organ failure but failed to respond to the primary treatment, she constitutes cholangitis of moderate severity.

Empirical antibiotic therapy for cholangitis is targeted towards gut organisms, particularly Gram-negative organisms. Commonly (including in our unit), ciprofloxacin is considered to be an appropriate empirical therapy. This is backed up by reports of an 85% clinical cure rate in trials [13]. The Tokyo Consensus group [13] failed to recommend a single specific empirical treatment, therefore local antibiotic guidelines will continue to direct empirical therapy. In the presence of positive microbiological investigations, there is a clear consensus that agents should be changed for more appropriate treatment according to sensitivity.

Biliary drainage reduces mortality and speeds recovery from cholangitis and is therefore a vital part of management [14]. The Tokyo guidelines recognize that this must be done in an emergency setting for patients with severe cholangitis and as promptly as practical in other patients. Endoscopic drainage is the preferred modality [15].

*Lactococcus lactis cremoris* is a Gram-positive coccus, formerly classified as *Streptococcus cremoris* but now recognized as a member of the genus *Lactococcus* [3]. This species is commonly regarded as non-pathogenic in immunocompetent adults, however we report the thirteenth case to our knowledge of this pathogen causing clinically significant infection. Previously, four cases of bacterial endocarditis [4,6,9,11], one of septicaemia [7], two liver abscesses [3,5] and one each of necrotizing pneumonitis [10], septic arthritis [8], deep neck infection [2], cerebellar abscess [4] and canaliculitis [1] have been reported. Of these, it appears that nine were immunocompetent patients. All bar one of the case reports were in adults (Table 1).

*Lactococcus lactis cremoris* is a recognized skin commensal of cattle and is also used in the dairy industry for milk fermentation. It may therefore be present in unpasteurized dairy products. Of the previously reported cases, six have been associated with a clear history of exposure to unpasteurized dairy products; in one of these cases, the organism was isolated from the milk product (Table 1). Our patient is not aware of having had any such exposure.

**Conclusion**

This report provides corroboration of evidence that *Lactococcus lactis cremoris* is a potential pathogen in immunocompetent adults. *Lactococcus lactis cremoris* has now been reported as a pathogen in many different systems, both acutely and subacutely. This may well represent an underreporting of the true incidence of invasive infection related to this organism.

Diagnosis and assessment of the clinical severity of cholangitis are now the subject of consensus guidelines. These guidelines also extend to the appropriate timing and method of biliary drainage. However, there remains a debate about the most appropriate empirical antibiotic therapy in this condition. In the light of this case, it is important to consider other potential pathogens causing ascending cholangitis.
Table 1: Previously reported cases of Lactococcus lactis cremoris associated infections

| Year | Age | Sex | Site of infection | Exposure to unpasteurized milk products | Treatment | Outcome | Immune status |
|------|-----|-----|-------------------|----------------------------------------|-----------|---------|--------------|
| 2006 [1] | 80 | F | Canaliculitis | None | Oral ampicillin and topical chloramphenicol | Complete resolution | Normal |
| 2005 [2] | 68 | M | Deep neck infection | Cow breeder and consumed unpasteurized milk | Ceftriaxone and metronidazole for 6 weeks | Resolution on discharge | Previous malignancy |
| 2004 [3] | 79 | F | Liver abscess | None | Percutaneous drainage, Imipenem Cilastatin for 5 weeks | Complete resolution | Normal |
| 2002 [4] | 45 | F | Cerebellar abscess | Not commented | Ceftriaxone 8 weeks, gentamicin 2 weeks, Metronidazole | No residual deficit and no recurrence at 9 months | Normal |
| 2002 [3] | 67 | M | Endocarditis | History of drinking unpasteurized milk | Co-amoxiclav and gentamicin 15 days | Well 6 months post discharge | Normal |
| 2000 [5] | 14 | F | Liver abscess | None | Percutaneous drainage | Discharged from hospital on day 48 | Normal |
| 1996 [6] | 56 | M | Endocarditis | None | Penicillin G for 12 days and Clarithromycin for 18 days | Well 18 months post discharge | Normal |
| 1995 [7] | 69 | M | Septicaemia | Yoghurt ingested | Cefotaxime and Amikacin | No comment | Chronic lymphocytic leukaemia |
| 1993 [8] | 57 | F | Septic arthritis | Unpasteurized milk | Penicillin for 6 weeks | Deformity 8 months post discharge, but no ongoing infection | Normal |
| 1990 [9] | 65 | F | Endocarditis | Not commented | Benzylpenicillin and gentamicin | No ongoing infection | Normal |
| 1990 [10] | 24 | M | Necrotizing pneumonitis and empyema | Unpasteurized milk and cheese eaten | Thoracocentesis (*3) | Well 1 month post discharge | HIV positive |
| 1955 [11] | 21 | M | Endocarditis | Sour cream known to contain S. Lactis | Penicillin and Dihydrostreptomycin for 22 days | Well 4 months post discharge | Normal |

Abbreviations
Hb: haemoglobin; WCC: white cell count; CRP: C-reactive protein; ALT: alanine aminotransferase; ALP: alkaline phosphatase; γGT: gamma-glutamyl-transferase; PT: prothrombin time; bd: twice daily; tds: three times daily; ERCP: endoscopic retrograde cholangiopancreatogram

Consent
Written informed consent was obtained from the patient for publication of this case report and any accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal.

Competing interests
The authors declare that they have no competing interests.

Authors’ contributions
JD and MDB were involved in patient care, carried out the review of literature and were jointly responsible for drafting and revising the manuscript. AJMW has provided editorial and clinical supervision.

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