An unusual case of polymicrobial anaerobic bacteraemia in a male with ureteral calculi

Nadim G. El Chakhtoura, 1 Asma Khatri, 1,2 Michael R. Jacobs, 3,4 Maria D. Wnek 5 and Robin L. P. Jump 2,6,7

1 Department of Medicine, University Hospitals Case Medical Center, Cleveland, OH, USA
2 Department of Medicine, Case Western Reserve University, Cleveland, OH, USA
3 Department of Pathology, University Hospitals Case Medical Center, Cleveland, OH, USA
4 Department of Pathology, Case Western Reserve University, Cleveland, OH, USA
5 Clinical Microbiology, Pathology and Laboratory Medicine Services, Louis Stokes Cleveland Veterans Affairs Medical Center, Cleveland, OH, USA
6 Geriatric Research, Education and Clinical Center, Louis Stokes Cleveland Veterans Affairs Medical Center, Cleveland, OH, USA
7 Infectious Diseases Section, Louis Stokes Cleveland Veterans Affairs Medical Center, Cleveland, OH, USA

Introduction: We describe an unusual case of anaerobic bacteraemia caused by Fusobacterium gonidiaformans and Peptoniphilus asaccharolyticus, both commensal organisms normally found within human oropharyngeal, gastrointestinal and genitourinary tracts.

Case presentation: One week following a routine colonoscopy with polypectomy, a 65-year-old male with renal calculi was admitted with a 3-day history of severe abdominal pain and chills. He required urgent placement of a percutaneous nephrostomy tube. Urine cultures were negative but blood cultures were positive for Fusobacterium gonidiaformans and Peptoniphilus asaccharolyticus.

Conclusions: We hypothesized that, following his colonoscopy, the patient developed transient bacteraemia with commensal gut organisms. In the setting of multiple ureteral calculi, this transient bacteraemia became a clinically significant infection, manifesting as acute ureterolithiasis with concurrent bloodstream infection. The routine collection of blood for anaerobic culture led to pathogen identification and appropriate antimicrobial therapy.

Introduction

Part of the normal flora of the human oropharyngeal, gastrointestinal and genitourinary tracts, Fusobacterium spp. are anaerobic, Gram-negative bacilli that may cause a wide array of infections involving tissue necrosis and septicemia (Bennett & Eley, 1993). Peptoniphilus asaccharolyticus (formerly Peptostreptococcus asaccharolyticus), also a common commensal bacterium of human mucosa, are anaerobic Gram-positive streptococci associated with abscesses, obstetrical infections and wounds (Brook, 1988).

We describe a case of polymicrobial bacteraemia caused by Fusobacterium gonidiaformans and P. asaccharolyticus probably due to disruption of the intestinal mucosal barrier during a routine colonoscopy with polypectomy.

Case report

A 65-year-old African–American man presented to our hospital with a 3-day history of severe left upper and lower abdominal pain, emesis, chills and intermittent left nostril epistaxis. Other symptoms included left mid-back pain and urinary frequency but no dysuria or haematuria. His medical history was notable for diabetes mellitus, hypertension, obstructive sleep apnoea and non-obstructing nephrolithiasis. He had had a routine colonoscopy 1 week prior to presentation with findings of diverticulosis; a single 2 mm sessile polyp was also removed from the ascending colon.

In the emergency room, the patient was febrile (38.6 °C) and tachycardic (113 min⁻¹) with a blood pressure near his usual baseline (164/92 mmHg⁻¹). Notable physical examination findings included clammy skin, moderate distress due to pain, a slightly distended abdomen with hypoactive bowel sounds and tenderness to palpation of the left upper and lower quadrants. He did not have suprapubic pain, costovertebral angle discomfort, rebound tenderness or guarding. Laboratory values included a white blood cell count of 25.5 × 10³ µl⁻¹ with 91.8 %
neutrophils, creatinine of 1.5 mg dl⁻¹, lactic acid of
3.3 mmol l⁻¹ (normal range 0.5–2.2 mmol l⁻¹), a normal
platelet count of 162 000 µl⁻¹ and a normal international
normalized ratio of 1.09. Liver transaminases were normal.
His urinalysis showed positive nitrites, 59 white and 62 red
blood cells per high-power field and 4+ bacteria. A
computed tomography scan of the abdomen and pelvis
revealed moderate left hydroureter and hydronephrosis in
the setting of multiple ureteral calculi (>5 stones, largest
7 mm), accompanied by periureteral and perinephric fat
stranding. Following the collection of urine and blood
cultures, the patient was started on vancomycin and
aztreonam, the latter chosen because of the patient’s
history of anaphylactic reaction to β-lactams.

He was admitted to the medical intensive care unit and
had a left-sided percutaneous nephrostomy tube placed by
interventional radiology. He remained haemodynamically
stable throughout the 6-day hospital course with resolu-
tion of his pain, fever, epistaxis and leukocytosis. Of note,
while in the medical intensive care unit, his platelets
decreased to 95 000 µl⁻¹ with a concurrent increase in
international normalized ratio to 1.43; these values
returned to normal before discharge.

The urine culture obtained prior to antibiotics was negative,
but blood cultures grew anaerobic Gram-positive cocci in
clusters and Gram-negative bacilli less than 24 h after
collection. The isolates were identified as P. asaccharolyticus
and Fusobacterium species based on colony morphology and
biochemical tests (Vitek-2 ANC anaerobe identification
card; Biomerieux). A matrix-assisted laser desorption/
ionization time-of-flight mass spectrometry system
(Bruker Daltonics) confirmed the initial findings of P.
asaccharolyticus and identified the Fusobacterium isolate as
F. gondiiiformans. The F. gondiiiformans isolate was
susceptible to penicillin, clindamycin and metronidazole.

The patient was discharged home to complete a 14-day
course of therapy with metronidazole. Following an
uneventful recovery, he received laser lithotripsy to remove
the ureteral calculi.

**Discussion**

*Fusobacterium* spp. are a rare cause of disease in humans,
with a recorded incidence of 0.55 per 100 000 of the
population per year, accounting for less than 1 % of all
bacteraemias and less than 10 % of anaerobic bacteraemias
(Afra et al., 2013; Bourgault et al., 1997; Ngo et al., 2013;
Nohrström et al., 2011; Yang et al., 2011), approximately
50 % of which are healthcare associated (Afra et al., 2013;
Bourgault et al., 1997). In 1936, Lemierre described
*Fusobacterium necrophorum* as a cause of oropharyngeal
infections causing septicemia in young healthy adults
associated with internal jugular venous thrombosis (Afra
et al., 2013; Brazier et al., 2002; Nohrström et al., 2011).
More recently, *Fusobacterium nucleatum* has emerged as a
pathogen causing bloodstream infections in elderly men
with underlying co-morbidities that include malignancy,
immune suppression, dialysis, cardiac disease and recent
surgery (Afra et al., 2013; Bourgault et al., 1997; Candoni et
al., 2003; Epaulard et al., 2006; Goldberg et al., 2012;
Nohrström et al., 2011; Yang et al., 2011). Interestingly, *F.
nucleatum* is one of the more common anaerobic
organisms involved in polymicrobial bloodstream infec-
tions; it is most often associated with coagulase-negative
*Staphylococcus* spp. and *Peptostreptococcus* spp. (Afra et
al., 2013; Bourgault et al., 1997; Goldberg et al., 2012;
Yang et al., 2011). Although poorly characterized so far, *F.
gondiiiformans* seems to be a member of the normal gut
microbiome (George et al., 1981). Rare case reports
describe *F. gondiiiformans* as a cause of peritonsillar and
retropharyngeal abscesses as well as septic thrombophle-
bitis in an intravenous drug user (Brook, 1994; George et
al., 1981; Gillis et al., 2011; Rubinstein et al., 1974).

*Peptostreptococcus* spp. are a more common cause of
bacteraemia than *Fusobacterium* spp., with a recorded
incidence of 0.9 per 100 000 of the population per year
(Ngo et al., 2013). Many *Peptostreptococcus* spp., including
P. asaccharolyticus, are part of the normal gut microbiome
and are largely viewed as having low virulence (Minces et
al., 2010). When found as a cause of disease, *Peptostreptococcus* spp. are usually part of polymicrobial
infections, often detected in conjunction with
*Fusobacterium* spp., as described above (Epaulard et al.,
2006; Yang et al., 2011). They are also rare causes of
infective endocarditis, often with high morbidity (Minces
et al., 2010).

Beyond sepsis caused by a polymicrobial anaerobic
bloodstream infection, this case has other unique features.
First, clinically relevant bacteraemia following colonosco-
copies are exceedingly rare (Hartong et al., 1977; Kumar
et al., 1982, 1983; Low et al., 1987). This remains true even
with procedures that disrupt the mucosal barriers such as
colorectal stent placement or endoscopic resection of
colorectal tumours (Chun et al., 2012; Min et al., 2008).
Our knowledge, this is the second description of sepsis due
to anaerobic bacteraemia following routine colonoscopy
with polypectomy; the first report described sepsis due to
*Clostridium perfringens* (Kunz et al., 2009). Secondly, the
patient presented with sepsis due to obstructive uropathy,
probably caused by anaerobic organisms, as bacteria were
noted on direct microscopy but aerobic culture did not
yield any growth. We hypothesize that either transient
bacteraemia during the colonoscopy or the procedure itself
may have caused modest peritoneal inflammation that was
sufficient to precipitate ureteral obstruction in this patient
with ureteral calculi. Anaerobic organisms are rare causes
of urinary tract infections (<0.1 %), but among patients
with negative aerobic cultures and with persistent signs
and symptoms of infection that localize to the genitouri-
inary tract, anaerobic cultures may assist with diagnosis
(Bannon et al., 1998). Thirdly, the patient presented with a
3-day history of epistaxis, moderate thrombocytopenia and
a slightly elevated prothrombin time, all of which resolved
with treatment of the underlying infection. These clinical features raise the possibility of a coagulopathy caused by the infection. Coagulopathy is a well-described feature of infection caused by F. necrophorum and may also be a feature of infection with F. nucleatum (Epaulard et al., 2006).

Finally, our case underscores the utility of anaerobic blood cultures. With no a priori suspicion for anaerobic pathogens, the patient’s urine was only cultured for aerobic organisms and was thus negative. Fortunately, the routine collection of blood for anaerobic culture led to pathogen identification and appropriate antimicrobial therapy for our patient’s infection.

Acknowledgements

Written informed consent was obtained from the patient for publication of this case report. A copy of the written consent is available for review by the editor of this Journal. The authors report no conflicts of interest.

References


