

Case Reports and Case Series Abstracts

CR1. Laparoscopic Drainage of a Primary Liver Abscess: the Hypermucoviscosity Phenotype of *Klebsiella pneumoniae*

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Background: Primary *Klebsiella pneumoniae* liver abscess with a hypermucoviscous phenotype is endemic in Southeast Asia; this condition has recently been reported in North America. The hypermucoviscous phenotype contributes to increased virulence and complicates drainage procedures. Mortality rates are as high as 10% for primary liver abscess and up to 40% with associated metastatic meningitis. Treatment includes both antibiotic administration and effective drainage procedures; we describe successful laparoscopic drainage of a primary liver abscess in a patient with a hypermucoviscous strain of *Klebsiella pneumoniae*.

Hypothesis: n/a

Methods: We performed a clinical case review and a review of the literature.

Results: A 32-year-old man who immigrated from Vietnam 12 years ago with a history of poorly controlled type II diabetes, presented with fever, right upper quadrant pain (RUQ), nausea, and vomiting. A RUQ ultrasound and subsequent MR demonstrated a 5.5 x 5.5 x 5 cm hypo-echogenicity collection in the right lobe of the liver. Attempted ultrasound-guided percutaneous drainage obtained only 1 mL of fluid and histologic findings of core needle biopsies were consistent with a liver abscess. The patient also had a right lower lobe pneumonia, and sputum cultures grew a hypermucoviscous strain of *Klebsiella pneumoniae*. Despite optimal IV antibiotic treatment, repeat imaging showed marked enlargement of the abscess. Due to the hypermucoviscous nature of the collection, the patient was not a candidate for standard interventional radiologic guided percutaneous drainage techniques. Laparoscopic drainage of 40 mL of pus and percutaneous placement of a 24 French Malecot drain was performed. The patient rapidly improved clinically, and a CT scan performed on postoperative day 7 demonstrated a significant resolution of the liver abscess. The patient completed a 6-week course of outpatient IV antibiotics prior to drain removal.

Conclusions: Primary *Klebsiella pneumoniae* liver abscesses due to hypermucoviscous strains are endemic in Asian countries; similar cases are now being reported in the United States. Liver abscesses due to *Klebsiella pneumoniae* isolates with a hypermucoviscosity phenotype can preclude standard successful percutaneous drainage. We demonstrate that laparoscopic unroofing and laparoscopic guided percutaneous large drain placement is an acceptable alternative to radiologic guided percutaneous drainage when *Klebsiella* of the hypermucoviscosity phenotype when less invasive percutaneous drainage techniques fail.

CR2. Lumbar and Sacral Brucellosis due to Queso Fresco Ingestion

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Background: Though brucellosis is the most common zoonotic disease worldwide, it is rare in the US, with about 100-200 cases reported annually. Diagnosis is often difficult and protracted due to vague constitutional symptoms. In this case we illustrate the complex management of a rare brucellosis infection of the spine.

Hypothesis:

Methods: The patient is a 22-year-old healthy male with no recent travel history who presented with low back pain after weight lifting and 3 months of weight loss and intermittent fevers. Imaging revealed osteomyelitis/diskitis of L5/S1 and abscesses involving the pre-vertebral, epidural and pelvic recesses (Figures 1A-C). Initial biopsies were inconclusive, but the patient later endorsed eating unpasteurized cheese (queso fresco) from Mexico; therefore Brucella serology was sent and was positive. The patient's disease progressed despite aggressive antibiotic therapy. With the involvement of Orthopedic surgery, Neurosurgery, Acute Care Surgery and Vascular Surgery the patient was taken to the operating room.

Results: Patient underwent debridement of the involved vertebrae and drainage of the abscesses. Multiple cultures failed to grow the organisms for sensitivity testing. Brucella PCR was positive. A month later, patient continued to show signs of disease progression and failed to defervesce despite ceftriaxone, doxycycline, and rifampin treatment; he returned a second time for further vertebrae debridement and drainage of prevertebral abscess as well as placement of tobramycin impregnated beads in the L5-S1 vertebral space (Figure 1D). Patient has symptomatically improved and appears well in followup.

Conclusions: Brucellosis infection, although rare, is important to understand due to its potential uses as a bioterrorism agent. This facultative intracellular pathogen is able to evade host immune responses through a smooth lipopolysaccharide coating. Although most cases present with fever and constitutional symptoms, over half of patients present with osteoarticular complications, including spinal and vertebral abscesses. A complex spinal brucellosis infection is best managed with multiple teams. Surgery should be considered if there is poor response to medical management.

CR3. Video-Assisted Retroperitoneal Debridement: A Single Center Review

Kyle Pribyl; Jessica Flanke; Victor R. Vakayil; Zac Novaczyk; Jillian Wothe; Kate Geschwind; John Butterfield; James Glover; Catherine Statz; Victor R. Vakayil; James Harmon

Background: Necrosis of pancreatic parenchyma or extrapancreatic tissues is present in 10%-20% of patients with acute pancreatitis and is associated with high rates of morbidity and mortality. The mortality rate of sterile necrotizing pancreatitis is 5-10%, while the mortality rate increases to 20-30% when the necrotic tissue becomes infected. Necrosectomy is the accepted treatment for infected necrotizing pancreatitis and can be performed open or in a minimally invasive fashion. Less invasive techniques such as video-assisted retroperitoneal debridement (VARD) have been shown to reduce the rates of complications.

Hypothesis: This study was performed to describe the technique, microbiology and postoperative outcomes associated with the VARD procedure.

Methods: We performed a retrospective review of patients who underwent a VARD procedure

following necrotizing pancreatitis over a seven year period from a single tertiary-care center. We evaluated patient characteristics and report the microbiology and antibiotic sensitivities of culture isolates.

Results: During our study period, a total of 320 patients were admitted for acute necrotizing pancreatitis and 7 patients ultimately underwent a VARD procedure; 4 of the 7 patients underwent multiple VARD procedures. All patients with acute necrotizing pancreatitis were managed in a stepwise manner. We placed a percutaneous retroperitoneal drain and used the drain tract as a guide to place a trocar for balloon inflation and subsequent debridement and drainage of the retroperitoneal space. We found that the VARD procedure led to decreased use of open pancreatic necrosectomy. The mean age of our patient population was 33.1 ± 9 years with a BMI of 33.4 ± 9.4 kg/m². ASA score was ≥ 3 in 92% (N=12) of patients, and 38% (N=5) had a wound class ≥ 3 . 62% (N=8) of necrotic tissue had positive bacterial cultures, 2 patients (29%) had no positive cultures. 57% of positive cultures grew *Enterococcus* species and 14% had positive fungal cultures. We did not identify any multi-drug resistant pathogens. Overall, 90-day mortality was 14%.

Conclusions: Infected pancreatic necrosis should be treated using a step-wise approach using minimally invasive techniques. The VARD procedure may lead to decreased hospital stay, decreased morbidity and improved mortality.

CR4. Outbreak of Carbapenemase-Producing Enterobacteriaceae in a Regional Burn Centre

Sarah Rehou; Melisa Avanness; Natasha Salt; Marc Jeschke; Shahriar Shahrokhi

Background: Antimicrobial resistance is an increasing problem in hospitals worldwide, though the prevalence of carbapenemase-producing Enterobacteriaceae (CPE) in our region is low. Burn patients are among the most vulnerable to infection because of the loss of the protective skin barrier. Because of this, burn centres prioritize infection prevention and control with measures like additional precautions, enhanced environmental cleaning, dedicated facilities, and mandatory use of personal protective equipment (PPE). This report describes a CPE outbreak in a regional burn centre.

Hypothesis: We hypothesized that contamination of in-room hand hygiene sinks with CPE was a potential source of transmission.

Methods: In a period of 2.5 months, four nosocomial cases of CPE were identified, three containing the KPC gene and one VIM gene. There was more than one month between the first and second KPC case, with no overlap in patient stay or rooms.

Results: The first two cases were identified while there was no CPE patient source on the unit. CPE KPC gene was isolated in sink drains of three different rooms. In addition to the rigorous infection control practices already in place due to the unique patient population, additional outbreak control measures were implemented. The burn centre restricted admissions to complex burns or burns $\geq 10\%$ total body surface area, in consultation with the attending surgeon. No elective admissions were permitted. To avoid CPE exposure to new patients, initial admissions were rerouted to the emergency department and, if possible, the patient was admitted to another unit. Patient cohorting was implemented through nursing team separation

for CPE positive and negative patients and geographical separation of CPE positive cases to one side of the unit.

Conclusions: Despite aggressive infection control measures already in place at our burn centre, there was hospital acquired CPE colonization/infection. Given there was CPE acquisition when there was no positive patients on the unit and CPE contaminated sinks of the same enzyme were identified, it suggests that hospital sink drains can become a potential source of CPE. This highlights the importance of sink design and other engineering solutions to prevent formation of biofilm and reduce splashing, or even consider removing sinks all together. CPE outbreaks also have significant associated health system costs due to additional length of stay and need for additional institutional resources.

CR5. Necrotizing Soft Tissue Infection Within 48 Hours Post-Scald Burn: A Rare Presentation

Luis Enrique Meza; Sarah Rehou; Courtney Grotski; Shahriar Shahrokhi

Background: Burns are initially considered sterile injuries due to the thermal effect on the skin and microbials. We report a case of a patient with a burn injury who developed a devastating necrotizing soft tissue infection (NSTI) early in the post-burn period.

Hypothesis:

Methods: An elderly male was admitted to an ABA verified burn centre after sustaining a 20% scald burn to his back and right upper extremity. He was found in the bathtub; a fall was suspected based on his history of Parkinson's disease and a finding of bruising to his bilateral knees. Initially, his hospital course was uneventful apart from an elevated creatine kinase, which decreased with adequate resuscitation without signs or symptoms of compartment syndrome. Thirty-six hours following his admission, he developed a rapid onset of progressively worsening renal function, respiratory requiring intubation, mechanical ventilation, and circulatory failure requiring vasopressor support. After ruling out other causes of shock and upon re-examination of his burns there were clinical signs of a rapidly advancing necrotising soft tissue infection. He was taken urgently to the operating room for aggressive debridement of nonviable tissue. He underwent a right shoulder disarticulation and extensive debridement of the right chest, abdomen, and back. Intra-operative tissue samples and preoperative blood cultures were positive for Group A Streptococcus. Following the surgery, he underwent renal replacement therapy and his multiorgan failure improved.

Results: NSTI in the context of thermal injury is a rare phenomenon and in the few reported cases in burn patients, necrotizing infections occurred closer to two weeks following the initial injury. In this case, a necrotizing infection was not initially suspected, contributing to a delayed diagnosis and treatment.

Conclusions: We encourage clinicians to consider a necrotizing infection in burn patients with rapid clinical deterioration. Wounds should be examined carefully and promptly. Surgical exploration is the gold standard for confirmation of a necrotizing infection.

CR6. Redistribution of Nitric Oxide by Phospholipid Nanoparticles and Elevation of Refractory Hypotension in Septic Shock

Cuthbert Simpkins; Juan Rodriguez

Background: The overproduction of the endogenously produced vasodilator gas, nitric oxide (NO), is a primary cause of unsurvivable hypotension in septic shock. Inhibitors of NO synthesis have failed clinical trials.

Hypothesis: NO is a lipophilic molecule. Therefore, the bioavailability of NO could be reduced and blood pressure elevated by preferential localization of NO into an infused fluid containing lipophilic nanoparticles (PN).

Methods: Measurement of nitric oxide content: Mass spectroscopy was used for quantification of NO. Patient #1 Elderly patient with septic shock due to an infected foot. The patient's blood pressure was 61/28 and mean arterial pressure was 39 mmHg in spite of being on norepinephrine 100mcg/min, epinephrine 30 mcg/min and vasopressin 0.1 unit/min. Patient #2 A middle-aged patient who had a failed heart transplant and septic shock unresponsive to treatment. The blood pressure was only 50/40 with a mean of 43 mmHg. The blood pressure did not respond to Levophed.

Results: As predicted NO was 50% more soluble in PN (figure B) than in water (Figure A). Ten measurements were made in PN and water. In arbitrary units mean values were 3.19 for PN and 2.12 for water. Unpaired Student's t test resulted in $p=0.0005$. After infusion of 500 ml. PN into patient #1 over 20 minutes the blood pressure increased to a mean of 59 mmHg and systolic of 91 and remained at this level for over ten hours. After infusion of 500 ml of PN into patient # 2 over 20 minutes the blood pressure increased from a mean of 43 to 69 mm Hg for two hours. In both cases blood pressure remained increased without further intervention until the families decided to withdraw care. Oxygenation improved in both. In patient #1 the PaO₂/FiO₂ ratio improved from 1.31 to 2.4 with PaO₂ increased from 92 to 120. Patient #2 had an increase in oxygen saturation on 100% FiO₂ from 90% to 98%. There were no adverse effects.

Conclusions: NO preferentially localizes to PN in vitro PN elevated blood pressure in two patients who had severe and otherwise irreversible hypotension due to septic shock. Oxygenation improved after infusion of PN The increase in blood pressure is consistent with the uptake of NO by PN. Additional mechanisms are possible. A clinical trial is warranted and is now in progress.

CR7. A rare case of Burkholderia Cepacia infection in an immunocompetent patient following Pancreaticoduodenectomy

Gregory Stettler; Candice Preslaski; Ryan Lawless; Mitchell Cohen; Barry Platnick

Background: Infectious complications occur in 25-35% of patients undergoing pancreatectomy. These infections are most commonly polymicrobial in nature. While infection is common in these surgical patients, systemic infection with Burkholderia Cepacia is extremely rare. B. Cepacia most commonly affects immunocompromised patients, especially those with cystic fibrosis or those undergoing lung transplantation. Herein, we describe a systemic

infection of *Burkholderia Cepacia* in an immunocompetent patient following pancreaticoduodenectomy.

Hypothesis:

Methods:

Results: A previously healthy 32 year old female presented with a large mass at the head of her pancreas diagnosed as a solid pseudopapillary tumor. She underwent elective pancreaticoduodenectomy. Her post-operative course was complicated by dehiscence of her pancreaticojejunostomy requiring early re-operation. Her post-operative course was also complicated by systemic *B. Cepacia* infection of multiple sites including the blood, a left sided pleural effusion, and multiple intraabdominal fluid collections. A work up for an immunocompromised state was negative. The patient was initially treated with broad spectrum antibiotics but maintained a persistent leukocytosis with intermittent low grade fevers. Antibiotic therapy was ultimately transitioned to intravenous Bactrim which led to a rapid improvement in her white blood cell count and other markers of systemic infection.

Conclusions: Infection with *Burkholderia Cepacia* most commonly affects immunocompromised patients and is rare. It is even more rare in the immunocompetent population. These infections remain difficult to treat because of the multi-drug resistant nature of the organism. *B. Cepacia* infection should remain in the differential of patients undergoing pancreas resection and may require different antimicrobial regimens than is usual for post-pancreatectomy infection.

CR8. Ehrlichia muris–like Pathogen Infection in a Renal Transplant Recipient in the Setting of Trauma

Kyle Pribyl; Zac Novaczyk; Jessica Flanke; Victor R. Vakayil; Kyle Pribyl; Jo-Anne Young; Robert Bulander; Youssef Hamade; Michael Park; James Harmon

Background: In the setting of trauma, a multidisciplinary surgical team is required to determine the most accurate diagnosis. This case outlines the identification of a rare infection by *Ehrlichia muris*–like pathogen (EML) in a transplant recipient in the setting of trauma. Species closely related to *E. muris* were discovered in 2004 as a cause of ehrlichiosis in humans. Sixty-nine cases of ehrlichiosis caused by EML have been reported in Minnesota and Wisconsin over 9 years.

Hypothesis: N/a

Methods: This is a retrospective case review.

Results: The patient is a 70-year-old man with a history of polycystic kidney disease who underwent bilateral nephrectomy and renal transplant in 2014 and is immunosuppressed on tacrolimus and mycophenolate mofetil. He was also taking warfarin for atrial fibrillation. He presented from an outside hospital with altered mental status the morning after a fall related to a week of ongoing fatigue, nausea and diarrhea. The patient deteriorated and was intubated. A head CT demonstrated a 6 x 3.5 x 3 cm right inferior temporo-occipital well-circumscribed hemorrhage with cystic component and mild mass effect. The neurosurgery team elected to

proceed with conservative management. However, in the context of fever and immunosuppression, the location and cystic component of the hematoma raised concern for a nontraumatic, infectious etiology. Transplant infectious disease evaluation resulted in the initiation of broad-spectrum antibiotics. Karius molecular blood assay returned positive for *E. muris* cell free DNA. Ehrlichia serology demonstrated a 1:256 titer of Ehrlichia chaffeensis IgG. Qualitative Ehrlichia species PCR was positive for EML. The patient was started on a fourteen-day course of doxycycline. Laboratory abnormalities common to ehrlichiosis improved: WBC increased from 2,800 to 4,500 $10^6/L$ and platelets from 47,000 to 118,000 $10^6/L$. AST and LDH were initially elevated at 67 U/L and 254 U/L, respectively. It is notable that patient lives in rural Minnesota. Chart review indicated a deer tick exposure and prophylactic treatment for Lyme disease within the last five months.

Conclusions: This case outlines the rare occurrence of ehrlichiosis due to EML in an immunocompromised renal transplant recipient. It also highlights the collaboration between teams including trauma, neurosurgery, and infectious disease which identified ehrlichiosis as the potential cause of the patient's cerebral hemorrhage despite limited case reports.

CR9. A patient with sepsis, coma, limb and bowel gangrene and skin ulcers: a diagnostic and therapeutic challenge

Hugo Bonatti

Background: Although uncommon in western civilization, poly vitamin deficiency together with protein malnutrition and endocrinopathy may be encountered in individuals presenting with critical illness including sepsis. Homeless status, poverty, drug and alcohol abuse as well as neglect have been identified as risk factors for this condition.

Hypothesis: Scurvy may still be encountered in the Western Civilizations.

Methods: A 77 year old female was brought from home to the emergency room in critical condition with fever, confusion, abdominal pain and distention, a necrotic left lower leg and a large sacral/gluteal necrotic area and multiple skin ulcers. Very poor living condition and domestic neglect had been reported.

Results: After stabilization and intubation for respiratory failure (x-ray showed pneumonia) on the ICU, she underwent emergency amputation of the necrotic limb. Blood cultures grew *Streptococcus pyogenes*, sputum cultures MRSA and *Haemophilus influenza* and appropriate antibiotic therapy was initiated. The next day, the large necrotic gluteal area was debrided down to viable tissue. During exploration for laparoscopic assisted colostomy peritonitis originating from scattered areas of ileum and colon necrosis was found and a 60cm necrotic SB segment and distal colonic segment were resected leaving her in discontinuity. The skin ulcers spread during the next days. On 2nd look surgery the ischemic terminal ileum was resected with an ileocolic anastomosis and an end descending colostomy was created. TPN was started. The patient was found to be profoundly hypothyroid and her vitamin C levels were unmeasurable. Aggressive vitamin C replacement was given as well as levothyroxin. However, the patient did not recover and family opted for hospice care.

Conclusions: The combination of skin ulcers, intestinal and soft tissue necrosis and dementia is a rare condition. The patient had vitamin C deficiency and hypothyroidism and most likely also

thiamin deficiency. Despite aggressive medical and surgical treatment and vitamin replacement, the patient succumbed to her critical condition. Such poly vitamin deficiency together with endocrinopathy should be considered in patient at risk presenting with similar unclear symptoms.