CASE REPORT: Multi-Organ Dysfunction and Systemic Inflammatory Response in Acute Pancreatitis
Dipti Bhoiwala, MD

History:
A 66 year old male presented with intermittent, severe, sharp epigastric abdominal pain with radiation to his back. The pain began suddenly 18 hours ago and was associated with nausea. The pain was not associated with food positional. The pain subsided in intensity over the night and he was able to sleep well without discomfort but was awoken in the morning with worsening epigastric abdominal pain. He now associated the pain with diaphoresis, decreased urinary output, and vomiting throughout the morning without relief. He also began having loose watery bowel movements. The stool did not contain mucus, and it was not particularly foul smelling. The patient denied recent use of antibiotics. He reported no new medications, no recent or past trauma, and no alcohol abuse.

His past medical history included hypertension, hyperlipidemia, asthma and glaucoma. His medications included trandolapril/verapamil, rosuvastatin, albuterol sulfate nebulizers, and latanoprost ophthalmic. Family history was noncontributory. The patient is a lifetime non-smoker. He denied intravenous drug use, blood transfusions, or extramarital sexual intercourse. He reports no recent travel outside of the country or ingestion of any new foods. He is a retired engineer. The patient’s review of systems was pertinent for denial of any associated chest pain, dyspnea, fevers, chills, cough, sore throat, confusion, blurry vision, or feeling of heaviness in his extremities.

Physical Exam:
On admission, the patient had a temperature of 98.2°F. His blood pressure was 161/100 and a heart rate of 71 bpm. He was breathing at a rate of 20 breaths per minute. His oxygen saturation was 98% on room air. His abdominal pain was rated 10/10. The patient was lying in bed in overt pain and distress. He was tachypnic and his breaths were shallow. Eye exam showed that his extraocular movements were intact, pupils were equal and reactive to light bilaterally, no fundus abnormality. Neurological exam revealed no focal findings. Motor exam revealed no weakness in all four extremities, and there was no cyanosis, clubbing, or edema. Pulses were intact, and rated 2/4. The cranial nerve exam was normal, and the remainder of a neurological exam revealed no focal findings.

Admission lab data is listed below in Table 1. In addition, cardiac markers were negative and the patient’s electrocardiogram did not show any ST-T segment changes or any arrhythmia. A right upper quadrant ultrasound showed a mildly hydropic gallbladder, no gallstones, no pericholecystic fluid, no gallbladder wall thickening, trace peripancreatic fluid, diffuse fatty infiltration of the liver, and no dilatation of the biliary tree including the common bile duct. A CT scan of the chest, abdomen, and pelvis revealed bilateral pleural effusions, an enlarged and edematous appearing pancreas, peripancreatic stranding and fluid, consistent with pancreatitis, diverticula of the colon, circumferential wall thickening of the hepatic flexure of the colon suggestive of colitis, and a small amount of ascites throughout the abdomen and pelvis. On plain abdominal film there was a paucity of air in the colon and a diluted portion of a loop of bowel in right colon consistent with possible ileus.

CASE REPORT: Cryptogenic Organizing Pneumonia
Paul Der Mesropian, DO

CASE REPORT: A Ruptured Mucocele of the Appendix
Progressing to Pseudomyxoma Peritonei
John H. Sun, DO

CASE REPORT: ‘Streptococcus milleri’ endocarditis
Nadia Lupercio, MD

CASE REPORT: A case of calciphylaxis in ESRD, on HD treated with medicinal maggot therapy
Zlatan Kurjakovic, MD
**Multi-Organ Dysfunction and Systemic Inflammatory Response in Acute Pancreatitis**

The patient was admitted under the context of severe pancreatitis with a Ranson’s score of greater than 8. Patient initially received aggressive intravenous fluid hydration and pain control with intravenous hydrocortisone. He also received intravenous meropenem for empiric coverage for infection as well as possible pancreatic necrosis. On the second day of admission, changes in his mental status with auditory and visual hallucinations were noted. He became dyspneic and tachypenic. By this point, he had received 10 liters of intravenous fluids. His renal function was also deteriorating with urinary output less than 15mL/hour. An arterial blood gas revealed hypoxic respiratory failure requiring mechanical ventilation. He became hypotensive requiring vasopressor support. His hematocrit was dropping and it was noted that he was developing cyanosis of his flanks. Concern for hemorrhagic conversion of the pancreatitis precluded the decision to obtain a repeat CT scan of the abdomen and pelvis. Results showed a pseudocyst forming between the body of the pancreas and stomach; there was no radiographic evidence of hemorrhage of necrosis of the pancreas.

Hospital Course:
During his intensive care stay the patient’s initial abnormal labs, except renal function, began to improve. He was titrated off the vasopressor in the first 48 hours. Patient continued to require mechanical ventilation because he was difficult to wean. Blood, urine, and respiratory cultures were negative for infection. Cultures for influenza virus and *Clostridium difficile* toxins assay were both negative. Patient underwent tracheostomy and percutaneous gastric feeding tube placement on day 16 of admission. The tracheostomy was required for persistent mechanical ventilation and the feeding tube was required for long term nutritional support. On day 18 of admission he developed ventilator associated pneumonia with *Pseudomonas*, and was started on levofloxacin. The patient's clinical condition soon stabilized with stable vital signs, intact mentation, and stable labs. He had persistent leukocytosis attributed to the pneumonia. He was transferred to a ventilator facility for continued monitoring. The patient and his family did not want any further aggressive measures, therefore invasive means of investigating the etiology of the pancreatitis were not pursued.

**Discussion:**
The patient’s diagnosis was multi-organ dysfunction secondary to a systemic inflammatory response syndrome (SIRS) in the setting of severe acute nonnecrotizing interstitial pancreatitis. Based on criteria that will be discussed later, this patient’s presenting mortality was close to 100%. On presentation, it was evident multi-organ dysfunction was already taking place as many of the organs were showing signs of damage such as the brain (altered mental status with a negative CT scan), lungs (new pleural effusions with pulmonary edema and hypoxic respiratory distress), the liver, kidney, and colon (ileus).

The criteria for deducing the severity of the pancreatitis and mortality in this patient included Ranson’s criteria, diagnosis of SIRS, and the presence of organ failure. Ranson’s criteria uses eleven parameters, five at admission and six 48 hours later. The patient in this case scored 8/11 indicating severe pancreatitis with a mortality of 100%. However, this scoring system is a poor predictor of severity. Therefore, SIRS was diagnosed based on four parameters. These parameters are white blood cell count, temperature, respiratory rate, and heart rate. This diagnosis combined with evidence of organ dysfunction on presentation qualified the patient to be aggressively cared for and monitored in the intensive care unit.

Multi-organ dysfunction can occur from an inflammatory response secondary to a trigger such as acute pancreatitis. SIRS occurs as a result of the release of pro-inflammatory cytokines and activated pancreatic enzymes from the inflamed organ. The cytokines involved in this process commonly are interleukin-1, interleukin-6, and tissue necrosis factor. In the early stages of acute pancreatitis, there is glandular invasion by macrophages and polymorphonuclear leukocytes. The activation of the complement system is suspected to cause this initial invasion. These cells then release the pro-inflammatory cytokines, proteolytic and lipolytic enzymes, and reactive oxygen metabolites. This overwhelms the scavenging capacity of the endogenous antioxidant systems. Furthermore, these above substances interact with the pancreatic microcirculation resulting in thrombosis and hemorrhage, and eventual development of necrosis. What is encouraging about the patient’s clinical course is that prior to discharge there was resolution of most the organ dysfunction. Suggesting the organ dysfunction was from the initial insult of SIRS which resolved with appropriate therapy.

The underlying etiology for pancreatitis in this patient remained uncertain at time of discharge. Unfortunately, further invasive investigation could not be pursued because of the patient’s preferences. An etiology is particularly important for this patient because it can help to potentially prevent future episodes of this life-threatening event. Our differential diagnosis included pancreatitis related to alcohol use, cholelithiasis, medication effect, infection, and hypertriglyceridemia. The patient had denied a heavy alcoholic intake. On preliminary studies there was not any clinical evidence for cholelithiasis. There was no history of using medications that commonly cause pancreatitis, such as thiazides. Infection could not be isolated, although viral (mumps) could have still been a cause. Patient did not have elevated cholesterol either.

Three other possible etiologies include hypercalcemia, the presence of hydroptic gallbladder, and malignancy. Hypercalcemia is an uncommon cause of pancreatitis. Here, it is suspected that the deposition of calcium in the pancreatic duct as well as the calcium induced activation of trypsinogen within the pancreatic parenchyma causes the inflammation of the organ. The hydroptic gallbladder suggests that there was a non-inflammatory distension of the gallbladder from an outlet obstruction such as an impacted stone or tumor in the neck of the gallbladder or in the cystic duct. Other causes of gallbladder hydroptic could be spontaneously resolving cholecystitis, and supporting evidence includes the abnormalities in liver function tests on the day of presentation. Malignancy was less likely due to the absence of an obvious mass on initial imaging.

### Table 1: Admission Laboratory Data

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>WBC count</td>
<td>25,300 mm³</td>
</tr>
<tr>
<td>Bands</td>
<td>25%</td>
</tr>
<tr>
<td>Hemoglobin</td>
<td>18.9 mg/dL</td>
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<tr>
<td>Hematocrit</td>
<td>54.5%</td>
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<tr>
<td>Potassium</td>
<td>3.3 mEq/L</td>
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<tr>
<td>Serum bicarbonate</td>
<td>32 mmol/L</td>
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<tr>
<td>Blood Urea Nitrogen</td>
<td>19 mg/dL</td>
</tr>
<tr>
<td>Serum Creatinine</td>
<td>1.6 mg/dl</td>
</tr>
<tr>
<td>Lactate Dehydrogenase</td>
<td>602 IU/L</td>
</tr>
<tr>
<td>Aspartate aminotransferase</td>
<td>505 IU/L</td>
</tr>
<tr>
<td>Alanine aminotransferase</td>
<td>562 IU/L</td>
</tr>
<tr>
<td>Total bilirubin</td>
<td>3.2 mg/dL</td>
</tr>
<tr>
<td>Direct bilirubin</td>
<td>1.3 mg/dL</td>
</tr>
<tr>
<td>Alkaline Phosphatase</td>
<td>205 mg/dL</td>
</tr>
<tr>
<td>Amylase</td>
<td>7,674 IU/L</td>
</tr>
<tr>
<td>Lipase</td>
<td>13,247 IU/L</td>
</tr>
<tr>
<td>Lactic acid</td>
<td>2 mmol/L</td>
</tr>
</tbody>
</table>

- **Aspartate aminotransferase**: 505 IU/L
- **Alanine aminotransferase**: 562 IU/L
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- **Direct bilirubin**: 1.3 mg/dL
- **Alkaline Phosphatase**: 205 mg/dL
- **Amylase**: 7,674 IU/L
- **Lipase**: 13,247 IU/L
- **Lactic acid**: 2 mmol/L
Multi-Organ Dysfunction and Systemic Inflammatory Response in Acute Pancreatitis

References:
10) Tenner S; Sica G; Hughes M; Noordhoek E; Feng S; Zinner M; Banks PA. Relationship of necrosis to organ failure in severe acute pancreatitis. Gastroenterology 1997 Sep;113(3):899-903.

Cryptogenic Organizing Pneumonia: A Case Report

Introduction:
Cryptogenic organizing pneumonia (COP), formerly known as idiopathic bronchiolitis obliterans organizing pneumonia (BOOP), is a rare clinicopathologic syndrome distinct from pneumonia [1]. It is called organizing because it involves abnormal healing by fibrosis, rather than resolution, of bronchiolar and alveolar exudates resulting from injury [2]. COP is usually suspected after a patient has failed one or more courses of antibiotics. It is important to identify because it constitutes as much as 30% of all cases of chronic infiltrative lung disease [3]. Although incidence is reported as 0.01%, COP may be more common and underdiagnosed [4]. At least half the cases are idiopathic, with the remainder of cases being associated most often with connective tissue diseases and inhalation exposure to toxins [3]. It tends to occur in patients just above middle age. It usually presents as a subacute onset of a dry cough, dyspnea, and constitutional symptoms (fever, malaise, fatigue, weight loss) for weeks to months following a flu-like illness [5]. Pleuritic chest pain and hemoptysis are less commonly reported [3]. Signs typically include crackles, wheezes (less often), and clubbing (unusual) [6]. ESR is often elevated and a mild neutrophilic leukocytosis is common. PFTs usually demonstrate a restrictive defect and a reduced diffusion capacity leading to mild resting hypoxemia [7]. Although a presumptive diagnosis may be made on classic clinical and radiographic features, the diagnosis requires the exclusion of other diagnoses as well as confirmation by lung biopsy (open, thoracoscopic, or less commonly percutaneous) [1]. In particular, a chest radiograph depicts bilateral, patchy, ground glass or alveolar opacities. HRCT reveals patchy air space consolidation, ground-glass opacities, small nodular opacities, and bronchial wall thickening and dilation. These changes occur more frequently in the periphery of the lung and in the lower lung zone. Lung biopsy shows granulation tissue or fibrotic changes (in more severe cases) within airspaces, along with chronic inflammation in the surrounding alveoli [5].

Case Presentation:
An 85-year-old male, with the diagnosis of pneumonia, was transferred from an OSH for continued management. He initially presented at the OSH with a 1-month history of progressive pleuritic chest pain. He was found to have a right-sided infiltrate on CXR and leukocytosis of sixteen.

He was treated with levofloxacin for presumptive pneumonia and transferred to Albany VA for further evaluation. Pertinent past medical history includes recurrent pneumonia requiring multiple antibiotic courses in the past, moderate COPD (emphysema), CAD s/p CABG, CKD, and a 70-pack-year smoking history.

At our facility, he complained of an intermittent, stabbing, non-radiating, bilateral chest pain aggravated by inspiration. Noteworthy was that he had a chronic dry cough and DOE, both no different than his baseline. He also complained of fatigue and recent weight loss of approximately 20 pounds over the last 6 months. He otherwise denied fevers/chills, sweats, hemoptysis, increased cough, sputum production, recent chest trauma, or sick contacts.

On examination, fine crackles in the right lower lung zones with occasional mild wheezes elsewhere could be auscultated posteriorly. He additionally may have had some mild clubbing. He was afebrile and had mild hypoxemia to the mid-90’s. Laboratory data was significant for a high-normal white count of 10.6 with neutrophil predominance, azotemia at baseline for his CKD, and mild chronic anemia. PFTs demonstrated an obstructive pattern with FEV1/FVC of 40% and a reduced diffusing capacity with DLCO of 66%.

CXR revealed reticulogranular infiltrates in the right lower and right upper lobes (Figure 1). HRCT of the thorax demonstrated severe interstitial lung disease of the right middle and lower lobes (Figure 2). Additional CT findings included severe centrilobular emphysema, occasional pleural thickening, multiple pulmonary nodules, a small bilateral pleural effusion greater on the right, and mediastinal lymphadenopathy. Around 3 months prior to admission, diffuse chronic-appearing interstitial opacities could be observed on CXR, and tree-in-bud opacities within the right middle lobe were evident on CT. Subsequent interval imaging suggested a gradual increase in the interstitial disease pattern to involve the right middle and lower lobes.

Overall, the radiographic sequence seen likely represented an orderly progression of interstitial airspace disease over 3 or more months, not an acute consolidation.
COP, especially the idiopathic form, generally has an excellent long-term prognosis. Mortality in COP has been estimated at 10%, which is relatively better than other interstitial pneumonias such as CEP, IPF, and pulmonary disease associated with a connective tissue disorder. The absence of blood and pulmonary eosinophilia were inconsistent with CEP. There were no physical manifestations and no history of CTD. Finally, the presence of pleural effusions, localized parenchymal densities, and confluent shadows on CT suggested an alternative diagnosis to IPF [8].

The diagnosis of CAP was essentially solidified by the histologic findings of fibrosis within the alveoli along with mild chronic inflammation, which is quite typical of an organizing pneumonia [9]. On admission, the patient’s antibiotics were stopped and he was started on an empirical trial of oral prednisone. Within 3 days of therapy, his pleuritic chest pain had subsided. He was discharged 2 days later on corticosteroid therapy and with appropriate pulmonary follow-up.

Discussion:
A case of COP where the major presenting symptom was pleuritic chest pain has been presented. Although this is a less common symptom in COP, it nonetheless did not weaken the diagnosis in any way. The failure of adequate response to antibiotics for presumptive pneumonia was perhaps the most salient point. Moreover, the development of symptomatology over a month and the progression of radiology over 3 months reflected the subacute nature of this disease. Of note is that PETs here showed an obstructive pattern rather than the characteristic restrictive pattern. Literature review verified that a combined restrictive and obstructive pattern is not uncommon [10], especially with this patient’s underlying COPD. A reduced diffusing capacity, which is almost always seen, was still present. Radiology and histopathology via percutaneous lung biopsy finally clinched the diagnosis. Noteworthy is that other modalities to obtain tissue, including open lung biopsy, BAL, and transbronchial lung biopsy during FOB, are more commonly used for diagnosis [2] but were not performed here since it was felt they would not change management.

It would seem appropriate to attempt to determine the etiology of COP in this case. Keeping in mind the caveat that up to 90% of cases are idiopathic [7], the most identifiable cause here is probably recurrent bouts of pneumonia. Cigarette smoking might be thought of as a risk factor but was actually not found to be one (the majority of patients are either nonsmokers or ex-smokers at the time of diagnosis) [7]. The presence of asthma is associated with COP [3] and may have been questionably present with this patient’s COPD. Finally, and doubtfully, it has been postulated that a relatively immunosuppressed state resulting from CABG could be related to COP [3].

Although COP may resolve spontaneously, patients usually require corticosteroid therapy [3]. Rapid response within days to weeks is seen in two-thirds of patients placed on steroids [6]. The patient presented here fortunately fit into this category. Prednisone at 1 mg/kg/day is usually initiated for 1-3 months, followed by a slow taper for 6-12 months [7]. Relapses frequently occur if treatment is stopped prematurely or tapered too quickly. Although relapses are common, they were not found to affect long-term outcome [1]. Cyclophosphamide is alternatively used for intolerance or failure of glucocorticoid therapy [1].

As mentioned before, COP is a diagnosis of exclusion. Malignancy was certainly a possibility given the patient’s tobacco abuse and constitutional symptoms, yet this was rendered less likely after a negative lung biopsy. The clinical picture was also not consistent with pneumonia. There was no increase in chronic cough, no fever, no leukocytosis, and no clear response to antibiotics. Furthermore, there was no immunocompromised state or travel history to suggest a chronic MAC or fungal (e.g. aspergillosis) lung infection. There was no occupational exposure to suggest asbestosis and no indication of drug-induced pulmonary fibrosis. In essence, the highest on the differential were other interstitial pneumonias such as CEP, IPF, and pulmonary disease associated with a connective tissue disorder. The absence of blood and pulmonary eosinophilia were inconsistent with CEP. There were no physical manifestations and no history of CTD. Finally, the presence of pleural effusions, localized parenchymal densities, and confluent shadows on CT suggested an alternative diagnosis to IPF [8].
Cryptogenic Organizing Pneumonia: A Case Report

Conclusion:
COP is an uncommon condition often initially mistaken for pneumonia. It is essential to recognize it in patients who do not display the typical pneumonia picture and fail antibiotic therapy. A presumptive diagnosis can be made based on a combination of clinical and radiographic features. The exclusion of alternative diagnoses and histopathologic examination are ultimately required to make the diagnosis. The successful outcome of the patient presented here can be attributed to a relatively simple treatment: prednisone.

Abbreviations:
COP, cryptogenic organizing pneumonia; BOOP, bronchiolitis obliterans organizing pneumonia; ESR, erythrocyte sedimentation rate; PFTs, pulmonary function tests; HRCT, high resolution computed tomography; OSH, outside hospital; CXR, chest X-ray; COPD, chronic obstructive pulmonary disease; CAD, coronary artery disease; s/p, status post; CABB, coronary artery bypass graft; CKD, chronic kidney disease; PET-CT, positron emission tomography - computed tomography; FNA, fine needle aspiration; BAL, bronchoalveolar lavage; FOB, fiberoptic bronchoscopy; MAC, mycobacterium avium complex; CEP, chronic eosinophilic pneumonia; IPF, idiopathic pulmonary fibrosis.

References:

A Ruptured Mucoze of the Appendix Progressing to Pseudomyxoma Peritonei
John H. Sun, DO

A 62 year old female was transferred from an outside hospital for management of rapid onset ascites. The patient initially presented to her primary care provider ten days prior to admission with a cough and abdominal fullness and pain. She was diagnosed a reducible umbilical hernia, and given a course of Azithromycin for bronchitis. The patient’s cough did not resolve and her abdominal pain and distension worsened. The patient also reported severe nausea and non-bilious, non-bloody vomiting, progressive over five days. She reported a ten pound weight gain in the past month. The patient denied melena, hematochezia, vomiting, progressive over five days. She reported a ten pound weight gain in the past month. The patient denied melena, hematochezia, vomiting, or change in bowel movements, fever or skin lesions.

The patient presented to an outside hospital with these complaints and transferred to Albany Medical Center once massive ascites was seen abdominal CT.

The patient’s past medical history included GERD, resolved H. pylori infection, Type 2 diabetes mellitus, hypercholesterolemia, and essential hypertension. She denied alcohol use. Her medications included Atorvastatin, Glipizide, and Pioglitazone. There was no family history of cancer or liver disease.

Physical examination was pertinent for a massively distended abdomen, diffusely tender to palpation, and dull to percussion in all four quadrants. No fluid wave was present. Bowel sounds were diminished, but present. The liver and spleen were not palpable. Vital Signs were stable and the remainder of her physical exam was normal.

Complete metabolic profile, complete blood count and coagulation panels were normal, except for an albumin of 3.0gm/dL. Other laboratory studies done on admission are as follows:

<table>
<thead>
<tr>
<th>Test</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>UA: Mucous, 1+Hb, trace glucose</td>
<td>CA125: 83.4 (0-35)</td>
</tr>
<tr>
<td>Hep B and Hep C Ab: negative</td>
<td>Alpha-FP: 2.6 (&lt;10)</td>
</tr>
<tr>
<td>H. pylori: neg</td>
<td>Chromogranin A: &lt;5</td>
</tr>
<tr>
<td>CA-119: 47 (equivocal)</td>
<td>Urine 24hr 5HIAA: 1.7 (&lt;15)</td>
</tr>
</tbody>
</table>

A diagnostic paracentesis produced 10mL of clear gelatinous material that could not be analyzed as peritoneal fluid.

Further review of the patient’s medical records discovered a history of intermittent diffuse abdominal pain leading to multiple primary care visits over the last five years. Serial CT scans, dating back to 2004, showed a progressive enlargement and eventual rupture of an intra-abdominal mass of the appendix consistent with a ruptured mucoele. The rupture had occurred two years prior to the date of admission. The patient had left the country and was lost to follow-up.
A Ruptured Mucocele of the Appendix Progressing to Pseudomyxoma Peritonei

Shown below are Serial Computerized Tomography scans of the patient over five years:

Top Left to Right: Abdominal CTs, taken four years prior and two years prior, respectively, demonstrating an 8.3x6.2 cm mucocele of the appendix that subsequently ruptured. Bottom Left to Right: Two views of an Abdominal CT taken prior to admission, demonstrating “scalloping” of the liver and spleen as well as a characteristically peripheral distribution of radiodense intra-abdominal material.

Hospital Course:
Following the paracentesis, the patient was evaluated by general surgery and diagnosed with pseudomyxoma peritonei as a consequence to a ruptured mucinous cystadenoma of the appendix. The patient was taken to the operating room four days later, where she underwent an exploratory laparotomy with resection of a 50cm abdominal tumor, appendectomy, bilateral salpingo-oophorectomy, debulking of 4 L of mucinous fluid from abdomen with excision of multiple small peritoneal neoplasms, omentectomy, and umbilical hernia repair. The patient tolerated the procedure well and was discharged home on post-operative day six with close follow up.

Discussion:
As with the standard evaluation of a patient with progressive ascites, one should first exclude more common etiologies, such as liver, pancreas, and bile duct pathologies, infections peritonitis, and hepato-portal vascular compromise. A careful history and physical examination, liver function tests, and a diagnostic paracentesis will narrow the differential diagnosis. The patient described above presented with a known pre-existing mucocele of the appendix, negative liver function tests, and her paracentesis yielded mucinous material that could not be analyzed as peritoneal fluid. Therefore, the clinical suspicion for neoplastic disease was very high on admission, and liver pathology was excluded from the differential.

The term "pseudomyxoma peritonei" describes a phenomenon characterized by a rapid onset of abdominal ascites due to the copious accumulation of a gelatinous material, secreted by intraperitoneal mucin-producing cells seeded within the peritoneum. These cells may originate from a multitude of different primary neoplasms (e.g. appendix, ovary/ fallopian tubes, large and small bowel, pancreas); however, the term PMP is classically and most commonly used to describe the result of a ruptured mucocele of the appendix as a subset of "disseminated peritoneal adenomucinosis," which may be used to describe disseminated mucin-secreting tumors originating from other tissues.

Pseudomyxoma peritonei is more common in females, and often found incidentally on a CT. Patients with symptoms frequently complain of increased abdominal girth, non-specific abdominal pain, inguinal hernias, and ovarian masses palpated on a pelvic examination.

Appendiceal neoplasms, which account for only 0.5% of primary intra-abdominal tumors, are classified into three groups: carcinoid tumors, epithelial tumors, and lymphomas. The epithelial class generally produces the mucin-secreting cells leading to PCP, though carcinoid and adenocarcinoid tumors are, by far, more common, accounting for 42% of all appendiceal neoplasms. If the patient has a carcinoid tumor arising from the appendix, she may present with flushing, telangiectasias, and diarrhea. All of these are mediated by excess secretion of kinins and serotonin.

Epithelium-derived appendiceal neoplasms can be further subdivided into mucinous cystadenomas, villous adenomas, and adenocarcinomas. Tumor markers such as CA-119, CEA, CA-125, are not diagnostic, however they are helpful in determining prognosis and response to treatment in known disease. With clinical suspicion, one may also obtain 24-hour urine 5-HIAA and Chromogranin A, both of which are metabolic products of serotonin and are markedly elevated in the serotonin-secreting carcinoid tumors.

The distinction between a "benign" cystadenoma and "malignant" adenocarcinoma and signet ring carcinoma of the appendix is an important one, as cystadenomas and carcinoid tumors are typically more responsive to chemotherapy and offer a better prognosis. Likewise, there is a significant prognostic distinction between PMP (68% 10 year survival) caused by a mucinous cystadenoma and carcinomatosis (9% 10 year survival) caused by a mucinous cystadenocarcinoma, which can be radiologically and clinically similar. Also, the surgical treatment for an adenocarcinoma generally involves a right hemi-colectomy in addition to debulking and removal of metastasis. The patient underwent a debulking operation that also involved resection of bilateral ovaries and fallopian tubes, as the ovaries and fallopian tubes are common sites of tumor spread in the mucinous dissemination of PMP.

Due to the infrequency of pseudomyxoma peritonei, there is limited evidence to establish a standard of care. Typical treatment for PMP consists of serial palliative surgical debulking with our without aggressive cytoreduction in combination with intraperitoneal heated chemotherapy, typically with mitomycin, aimed at curing the disease.

Several non-randomized clinical trials show an improvement in mortality with aggressive cytoreduction and chemotherapy for the treatment of disseminated disease, one of which reported 5-year survival rates up to 86% versus a 75% 5-year survival with surgical debulking treatments alone. The prognosis of PMP can vary widely depending on the histology of the primary neoplasm. Unfortunately, experts have yet to reach a consensus on classification criteria of the disease, and there have yet to be adequately randomized clinical trials that demonstrate mortality benefits with aggressive treatment. It is important, however, to bear in mind that even a benign-appearing mucocele of the appendix may have the propensity to rupture, resulting in the dissemination of neoplastic disease, should receive to surgical evaluation for an appendectomy. Survival rates for a carefully resected unruptured mucocele, regardless of its propensity for mucinous dissemination, is estimated to be 91-100%.
A Ruptured Mucocele of the Appendix Progressing to Pseudomyxoma Peritonei

References:
7) Rorstad, O. Prognostic indicators for carcinoid neuroendocrine tumors of the GI tract. J Surg Oncol. 2005 Mar 1; 89(3).
8) Sugabaker, PH. Results of Treatment of 385 Patients with Peritoneal Surface Spread of Appendiceal Malignancy. Ann surg Oncol. 1999 Dec; 6(8).

STREPTOCOCCUS MILLERI' ENDOCARDITIS
Nadia D. Lupercio, MD

Case Report:
An 85 year old, with a past medical history significant for coronary artery disease, carotid endarterectomy, prior subdural hematoma treated with evacuation craniotomy and seizure disorder presented to the emergency department with complaints of generalized weakness, weight loss of approximately 10 pounds and increased somnolence.

On examination, the patient was disheveled. He was conversant and alert and orientated to person and place. He was cooperative but a poor historian. He was afebrile and offered no complaints, but on further workup in the ED was found to have an elevated troponin. After admission to the medical floor, he was started on treatment for ACS. Patient’s was noted to have chronic leukocytosis since June 2008 and a work up by the patient’s primary care physician had already been initiated. Upon further investigation into the patient’s records, it was noted that the patient had a positive blood culture for 'S. mutans' previously. Blood cultures were repeated in the emergency department.

Laboratory findings included marked leukocytosis (WBC 17.6 with 88.7 % neutrophils), and an elevated alkaline phosphatase (189 IU), ALT of 30 IU and AST of 32 IU. Blood cultures revealed a B- haemolytic group C 'S.milleri' species. An initial 2D cardiac echocardiogram revealed no valvular vegetations, but a transtheosophageal echocardiogram showed aortic valve vegetation with no abscess and trace aortic insufficiency. A CT scan of the head revealed an elongated isodense extra-axial collection most likely representing dural thickening as its appearance was unchanged compared with prior exams. There was no evidence of acute hemorrhage, mass or shift midline.

The patient improved with sterilization of blood cultures and resolution of his leukocytosis. An abdominal CT scan was performed to look for any hepatic abscesses and no acute findings were found. A PICC line was placed in the patient and the patient was discharged back to the nursing home on intravenous antibiotics (Penicillin G 18MU for 6 weeks) and was followed by Infectious Disease as an outpatient. Prior therapeutic surveillance blood cultures remained negative. Patient’s mental status remained at baseline.

Discussion:
Group C streptococci are chain forming Gram-positive cocci, facultative anaerobes, and are usually B-haemolytic on sheep blood agar, where they produce large (>0.5mm) or small (<0.5 mm) colonies (Rashid 2007). ‘S.milleri’ is a heterogeneous group in which 80% of strains hydrolyse trehalose, lactose, salicin and sucrose (Ball and Parker, 1979).

Group C streptococci, especially large colony strains, are well recognized pathogens in a variety of animals and birds, but only rarely cause disease in humans. Small-colony group C streptococci are endogenous for humans and are well recognized skin and mucosal colonizers (Hare, 1940; Rolston, 1986; Gossling, 1988), with the majority of infections in or near areas of known colonization (Gossling, 1988; Duma et al., 1969). When pathogenic or causes of bacteremia, members of the 'S. milleri' group are typically associated with suppurative disease of soft tissue and organs (Molina et al., 1991,Kowlessar et al., 2006). Endocarditis caused by small colony group C 'S.milleri' are distinctly uncommon. One review of >130 cases of endocarditis over nearly a decade found that B-haemolytic streptococci accounted for fewer than 5 % of cases (Sandre & Shafan, 1996). A second review of 31 B haemolytic streptococci endocarditis cases found none were caused by 'S.milleri' (Stein & Panwalker, 1985). In another study it accounted for 5.4% of 317 bacteriologically proven cases in one report (Parker and Ball, 1976), and 5% of 68 cases in another (Murray et al., 1978).

Incidence of 'S.milleri' infection has been reported as 0.14/100,000 (Laupland et al., 2006). Patients with group C infection are usually elderly, frail men (>2:1 male to female cases) with multiple medical co-morbidities and with poor dental hygiene (Laupland et al., 2006). Patients have also been found to be immunocompromised by malignancy, AIDS or surgery (Gossling, 1988, Vartian et al., 1983; Skogberg et al., 1988, Salata et al., 1989).

Positive group C streptococcus cultures should prompt further investigation into the source of infection. New S.milleri cases are occurring sporadically, such as the case involving a scorpion sting (Wheatley et al., 2005). In this case infective endocarditis developed in two patients several weeks after they suffered repeated scorpion stings. There have also been cases of S.milleri infections as a complication of colonoscopic procedures (Paraskeva et al., 2000). These cases demonstrate that S.milleri has the capacity to transform into a life threatening infection (Bala et al., 2006) and therefore it is crucial that there be a timely and appropriate response to group C streptococcal infections.

Conclusion:
In conclusion, this case report serves as a reminder of the importance of timely diagnosis and treatment of patients with 'S.milleri' endocarditis. This case would also lend support to the suggestion already made that patients with infective endocarditis due to this organism should be carefully monitored both during and after appropriate antimicrobial therapy (Murray et al., 1978).

References:
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A CASE OF CALCIPHYLAXIS IN ESRD, ON HD TREATED WITH MEDICINAL MAGGOT THERAPY

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Introduction:
Calciphylaxis has been called a "skin equivalent of myocardial infarction". Cutaneous arterioles narrowed by medial calcification and subintimal fibrosis are predisposed to thrombotic occlusions that lead to ischemic skin necrosis and formation of violaceous areas of cutaneous eschar in extremities, raised calcium phosphorus product, elevated PTH levels, radiographic evidence of vessel and soft tissue calcification and finding of mural calcification affecting small arteries and arterioles.

The pathogenesis of calciphylaxis includes cutaneous arteriolar stenosis, which occurs via medial arteriolar calcification, and vascular thrombosis, which develops acutely and is characterized by painful ischemic purpura.

Two main risk factors include elevated calcium phosphate product and hyperphosphatemia (usually due to hypocalcemia leading to hyperparathyroidism which leads to a low turnover of bone and with reduced capacity to buffer calcium and phosphate, leading to vascular calcifications. Obesity has been associated with calciphylaxis and this is thought to be due to adipocytes producing increased levels of TNF alpha, IL-1 and IL-6, markers of chronic inflammation that lead to vascular calcium deposition. Aluminum excess has also been found to be associated with this condition as it has a direct toxic effect on osteoblasts which leads to inducible osteomalacia. Aluminum excess historically came from aluminum based phosphate binders or aluminum tainted dialysate water. Interestingly, hyperparathyroidism leads to increased aluminum absorption, as well as low ferritin levels. Calciphylaxis is found in women: men in a 5:1 ratio. The role of estrogen is thought to be related to increased osteoprotegerin which acts as a protective agent on bone loss, but once osteoporosis is present it is thought to be related to increased osteoprotegerin which acts as a protective agent on bone loss, but once osteoporosis is present it is thought to be related to increased osteoprotegerin which acts as a protective agent on bone loss.

The prognosis of patients with calciphylaxis is usually poor, with an annual mortality of 45%. Patients with plaque formation have lower (41%) mortality, while those who present with ulcerations have 67% annual mortality rate. The majority of patients die from. Those that survive have high morbidity, prolonged hospitalizations and a significant number of patients progress to needing limb amputations.

Treatment of calciphylaxis is generally unsatisfactory and largely supportive and includes control of calcium and phosphate product levels by recommending a diet low in phosphate intake, use of calcium based phosphate binders, bisphosphonates, parathyroidectomy, and sodium thiosulfate to chelate calcium. Then, management involves wound care and prevention of sepsis. Besides maggott treatment which was discussed above, wound debridement is an option. However, it remains controversial, in one study 1 year survival rate for 17 patients improved to 61.6% vs. 27.4% for control group containing 46 patients with medical management. Hyperbaric oxygen therapy which promotes wound healing by elevating oxygen content in diseased tissue, improving angiogenesis and phagocytosis, inhibiting bacterial growth and decreasing local tissue edema can be considered.

Case Presentation:
33 year old African American woman was brought to ED by EMS with altered mental status and two grand mal seizures. On arrival, the patient was found to be hypertensive, tachycardiac and tachypneic (BP 230/140, HR 150, RR 36) The patient was intubated for airway protection due to lethargy. Initial labs revealed leukocytosis of 36.2K with 16% bandemia and neutrophilic predominance 61%, H&H 9.1 and 28.7. K 5.8, BUN 89, creatinine 13.7, AG of 14. ABG: 7.19, PaO2 47, PCO2 42, HCO3 16. Pt. received emergency HD in ED.

PMH is significant for dialysis dependent ESRD secondary to uncontrolled HTN and NSAID overuse, recurrent catheter sepsis (MRSA and acinetobacter), adrenal insufficiency and chronic anticoagulation therapy due to recurrung DVT’s in both LE, s/p IVC filter placement. HTN was controlled with Clonidine 0.2 mg TD weekly patch, Nifedipine 90 mg PO BID and Nadolol 80 mg PO daily. Her adrenal insufficiency was compensated by prednisone 20 mg PO daily. The patient is also a morbidly obese woman with BMI > 50.

Pt had 4 chronic wounds on lower extremities consistent with calciphylaxis. Due to her multiple comorbidities, she was deemed high risk for surgical management. Her largest wound was on left lower extremity - medial (3x5 cm) and lateral (3x8 cm) calf. All
A CASE OF CALCIPHYLAXIS IN ESRD, ON HD TREATED WITH MEDICINAL MAGGOT THERAPY

wounds were cover with thick eschar and necrotic tissue with minimal drainage and no erythema or warmth. Pulses were 1+ bilaterally distally and 2+ bilaterally proximally in groin, no clubbing, no cyanosis and 1+ edema over LE.

2 weeks after admission she developed VRE bacteremia (resistant to vancomycin, rifampin, gentamicin, ampicillin, with intermediate resistance to doxycycline and susceptible to linezolid), and was treated with 21 days of daptomycin as per infectious disease recommendation. Chronic wounds were thought to be the port of microbial entry. She was started on sodium thiosulfate intravenously concomitantly with antibiotic therapy.

Following completion of antibiotic regimen, she underwent parathyroidectomy to further treat calciphylaxis by controlling CaPO4 product. Her PTH level was 1315 (10-69 pg/ml normal). Her CaPO4 product was consistently > 70. Highest recorded levels during hospitalization were calcium was 11.7 with PO4 of 13.7 (Calculated CaPO4 product of 160). Following subtotal parathyroidectomy PTH dropped to 12 pg/ml. Pt. was started on hypocalcemia protocol and during this time lowest calcium level recorded was 7.7. In addition to supplementation pt. received high-calcium baths during HD sessions.

Despite intravenous sodium thiosulfate, parathyroidectomy, increased number of HD sessions from 3 to 4 times a week and aggressive wound care to include wet to dry dressing as well as hydrocolloid dressings, calciphiylactic wounds over LE showed no signs of improvement.

The plan was made to proceed with medicinal maggot debridement followed by wound VAC application and skin grafting to close the wounds. Since she had extensive wound involvement, maggot debridement was planned to be done in 3 stages, each stage lasting for 72 hrs. Medicinal maggots ordered were Lucilia Sericata species. Maggots were sterile and would come in test tubes containing 250-500 organisms. Formula for debridement recommended at least 10 maggots per square cm of wound for sufficient debridement. During the first stage of debridement maggots were applied to right lower extremity calciphylaxis measuring 6x5cm, with approximately 300 organisms used. Pt. tolerated therapy well first 48 hrs. Last 24 hrs were complicated by inadequate analgesia using PO MS Contin and Oxycodone. Following completion of debridement wound looked clean, no remnants of eschar were visible and underlying tissue was salmon pink with good vascular supply. The second bout of maggot therapy was planned for largest and deepest calciphylaxis over left upper tight. Area measured in excess of 120 cm squared and 2.5 cm in depth. 1500 maggots were applied in the wound bed. Pt. tolerated therapy for only first 24 hrs secondary to pain. Despite the fact maggots were kept on only for 24 hrs, wound eschar was completely gone and underlying tissue was perfused well with good potential for granulation tissue growth. She refused third bout of medicinal maggots to be placed on 2 remaining calciphylaxis despite having an IV access for optimal pain control during third round. She opted out to follow with plastic surgery on outpatient after finishing wound VAC application to debrided area for 3 weeks. She was conservatively treated with ongoing wound nursing care as an outpatient.

Discussion:
Maggot debridement therapy had been used prior to the advent of antibiotics and improved surgical and anesthesia technique which made this technique obsolete. Maggots act in 3 primary ways: debriding, disinfecting and promoting production of granulation tissue. Medicinal maggots involved use of live, sterile and disinfect fly larva. Maggots excrete salivary enzymes and dissolve necrotic and decompose tissue debris.

Maggots then ingest the predigested material and bacteria. Bacteria are eliminated both in maggot digestive system and from antibactericidal excreted in the saliva of the maggots. Granulation tissue production is stimulated by excretions containing calcium carbonate, urea, and allantoin. In addition, granulation tissue is enhanced mechanically by maggot movement in wound bed. Systemic antibiotics do not affect the maggots. FDA approved use currently exist for debridement of non-healing necrotic venous ulcers, neuro-pathic foot ulcers and non-healing traumatic or postsurgical wounds. The North American supplier is Monarch Lab in Irvine, Ca who sells a vial with 250-500 larvae for $88 + shipping and handling. Most wounds require 1-2 applications with 3-7 day course per application. Two different techniques exist for maggot placement in wound bed. Free-range vs. contained method. Free range method is considered superior as it requires fewer maggots per treatment and reduced duration of therapy application. Prospective study of 9 hospitals on 70 patients with chronic leg ulcers has found that on average maggot therapy decreases wound size by 5%, necrotic tissue by 68% and increases granulation tissue by 26%. Retrospective study of 18 diabetic patients with 20 non-healing foot and leg ulcers divided in three groups – maggot therapy, conventional therapy (surgical debridement) and mixed group where surgical debridement was followed up by maggot therapy, found that all ulcers were completely debrided 4 weeks after application of maggots vs. conventional therapy that still contained necrotic debris on 33% of ulcers treated. Maggot treated ulcers had granulation tissue covering 56% of the wound compared to conventionally treated ulcers that had only 15% of granulations tissue on the wound base. In one study using 13 diabetic patients with MRSA chronic foot ulcers distal to malleoli, non healing for least 3 months, 12 out of 13 ulcers had MRSA colonization eliminated after mean of 3 larval therapy applications.

Conclusion:
Use of medicinal maggot debridement therapy should be encouraged in calciphylaxis patients who fail conservative medical management and have recurrent bacteremic episodes and/or are poor candidates for surgery due to the milieu of host issues including complicated and advanced medical disease with poor prognosis and high risk from surgery. In addition, medicinal maggots are relatively cheap, have no known side effects except for pain. In addition, maggots do not damage or debride healthy tissue. In an era of increased diabetes prevalence, increasing life scans of ESRD patients, era of multidrug resistant infections, calciphylaxis may be an increasing problem and increased utilization on medicinal maggots should be emphasized and encouraged.

References: