Patient Safety Tip of the Week

May 14, 2013

Acute Colonic Pseudo-Obstruction (Ogilvie's Syndrome)

We've had a longstanding interest in the autonomic nervous system and at one time ran a clinical autonomic assessment service. So we've known about Ogilvie's Syndrome for many years. This condition was first described by Ogilivie in 1948 (Ogilvie 1948) and the term "acute colonic pseudo-obstruction" was later used for it by Dudley et al (Dudley 1958). We'll refer to it as ACPO in the rest of today's column. Because Ogilvie reported colonic pseudo-obstruction in 2 patients with retroperitoneal tumors invading the sphlancnic plexus he felt that disordered autonomic function was the underlying pathophysiology. The relationship to the autonomic nervous system, however, remains controversial and the true underlying pathophysiology remains speculative.

But we're not writing about acute colonic pseudo-obstruction today out of academic interest. We're writing about it as a patient safety issue, prompted by the deaths of two friends last year who developed colonic pseuo-obstruction after orthopedic surgery. Because the condition typically develops around the anticipated time of discharge after many orthopedic procedures and the early symptoms may be subtle, it is extremely important to recognize the syndrome. Unrecognized or untreated, the condition may lead to colonic ischemia and/or perforation with consequent sepsis and potential death. Mortality rates have been reported to be 40-50% once ischemia or perforation have occurred (De Giorgio 2009).

The condition, of course, is not unique to patients undergoing orthopedic surgery (see below for other associated conditions and/or contributing factors) but it is common enough after orthopedic procedures that any facility performing lots of total joint arthroplasties is likely to encounter cases. One study (Nelson 2006) retrospectively studied over 1100 total hip and knee arthroplasties over a 7 year period and found 18 cases of ACPO postoperatively. The incidence was 1.6% for hips and 1.5% for knees. Another study (Norwood 2005) found an incidence of ACPO of 1.3% in hip replacements, 0.65% in knee replacements, and 1.19% in spinal surgeries. And a more recent study from China (Zhang 2011) found an overall ACPO incidence of 1.4% for total hip or knee arthroplasties. So if you are a high volume joint arthroplasty facility,

expect to see a few cases every year. Even if you are a small volume facility you are likely to see a case or two over a several year period.

There are several good reviews of ACPO (Batke 2008, De Giorgio 2009, Nelson 2006, Tenofsky 2000). For those interested in the potential pathophysiological mechanisms involved in ACPO we refer you to reviews by Batke and Capell (Batke 2008), DeGeorgio and Knowles (De Giorgio 2009), and Jain and Vargas (Jain 2012).

Compared to acute mechanical colonic obstruction, the pain in ACPO may be variable. Actually the most common symptom is likely to be **abdominal distension**, with or without pain. While pain does eventually occur in most patients with ACPO it is usually less severe than that seen with mechanical large bowel obstruction. Severe pain is usually an indication that colonic ischemia or perforation have occurred. Failure to pass stool or flatus is seen in about half of patients with ACPO, though some may have paradoxical diarrhea. Over half also have nausea and vomiting.

The most salient feature on physical examination is usually abdominal distension. Abdominal tenderness, if present at all, tends to be mild and diffuse unless colonic ischemia or perforation have intervened. There is usually tympany to abdominal percussion. Bowel sounds are variable. They may be reduced or absent and one might hear the high-pitched tinkling sounds we associate with bowel obstruction but in cases where the small bowel is functioning normally there may be normal bowel sounds. Significantly, many patients with early ACPO don't "look sick", giving rise to a false sense of security. Fever is uncommon unless colonic ischemia or perforation has occurred or it may be due to other concomitant conditions.

Radiologic imaging is critical to diagnosis and differentiation from mechanical large bowel obstruction. Plain films of the abdomen show massive colonic dilatation. While some degree of small bowel dilatation is also commonly seen, the degree of colonic dilatation is disproportionate. This helps distinguish ACPO from the far more common postoperative ileus. The proximal colon is typically more distended than the distal colon and there may be cut-off points or transition zones beyond which the colon appears normal. While some have said such cut-off points favor ACPO over mechanical large bowel obstruction, those are not specific enough to reliably differentiate the two conditions. Therefore additional imaging studies are usually needed. Abdominal CT is said to have both sensitivity and specificity over 90% for ACPO (Batke 2008) and is typically the modality most often used in diagnosis of ACPO. Some have used contrast enemas but barium enemas carry a risk of colonic perforation and water-soluble contrast enemas carry a risk of dehydration. Colonoscopy (see below for the therapeutic use of colonoscopy in ACPO) may also have some diagnostic value but also carries risks of perforation.

Other laboratory tests are done to look for potential contributing factors (eg. fluid and electrolyte disturbances, hypothyroidism, etc.) or complications (eg. leukocytosis in sepsis or colonic ischemia). A high serum lactate level would also suggest either colonic

ischemia or sepsis. Appropriate testing for C.diff infection is also indicated in those cases where diarrhea is present.

Management of ACPO is dependent upon multiple factors. Most important is monitoring the patient both clinically and radiologically. The greatest dangers of ACPO are colonic ischemia and colonic perforation. If you remember the Law of LaPlace the wall tension in a tubular structure is greatest where the diameter is greatest. That corresponds in the colon to the cecum and that is where most perforations occur in ACPO. Hence, **close monitoring of cecal diameter** is a cornerstone of management in ACPO. That can be done by plain radiographs or abdominal CT scanning. One study emphasizing the presence of transitional zones (Choi 2008) had a patient population which probably had mostly patients with chronic colonic pseudo-obstruction rather than ACPO. That article, however, makes the point that CT may be more helpful than plain abdominal radiography for accurate measurement of cecal diameter because fluid or fecal material can obscure the margins of the cecum on plain radiographs.

Because most perforations occur in patients with cecal diameters of 12 cm. or greater, that parameter (i.e. cecal diameter = 12 cm.) is generally used as the point where conservative management should be replaced by more interventional management.

Conservative management usually consists of keeping the patient NPO and correcting any contributing factors like fluid and electrolyte disturbances. Nasogastric tubes and suction are probably of limited efficacy. Rectal tubes have been used but probably don't do much to decompress the proximal colon. Ambulation and frequent patient repositioning are thought to help propel colonic gas more distally. It probably also makes sense to discontinue any drugs that may inhibit GI motility (eg. opiates, anticholinergics).

Most cases of ACPO resolve spontaneously with conservative therapy in a median of 4 days (Batke 2008). However, interventions (pharmacotherapy or therapeutic colonoscopy) may be necessary in those who do not respond to conservative therapy. **Management algorithms** are proposed by several authors (Batke 2008, De Giorgio 2009, Jain 2012, Nelson 2006). The usual first intervention is such cases is a trial of intravenous **neostigmine**. See any of those 3 articles for details about the dose of neostigmine, the parameters that need to be monitored, the potential side effects and contraindications, and the potential need for repeat doses. The article by Jain and Vargas (Jain 2012) also discusses some of the novel potential pharmacological interventions. In those failing to respond to either conservative treatment or neostigmine, **colonoscopic decompression** may be recommended. Because colonoscopy does carry a risk of perforation, it should only be done by an experienced endoscopist, with as little air insufflation as possible, and should be discontinued if signs of colonic ischemia are seen. Some have also utilized tube placement in the right colon, though the evidence base is not substantial at this time. Colonoscopic decompression is said to be effective in up to 80% of cases though randomized controlled trials have not been done and some patients require a repeat procedure. The above reviews also discuss the potential use of **percutaneous transperitoneal cecostomy**. Because of the very high mortality rates

associated with surgery, **surgery** is usually reserved for those with evidence of colonic ischemia, perforation or peritonitis.

That part of the proposed algorithms suggesting a trial of neostigmine prior to decompressive colonoscopy has recently been challenged (Tsirline 2012). Those authors did a retrospective review of 100 patients with ACPO over a 10-year period and found that colonoscopy was significantly more successful than neostigmine after one intervention (75% vs. 35%) or two interventions (85% vs. 56%) with little difference in procedural morbidity. In addition, cecal diameters decreased more significantly with colonoscopy. Though this was not a randomized controlled trial and it was not clear why certain patients got neostigmine first and others got decompressive colonoscopy first, the authors suggest that colonoscopy should be considered first line therapy for ACPO.

Though we've emphasized ACPO following orthopedic procedures, the condition has been reported in association with a variety of other disorders. Overall, a majority occur following surgery or trauma (Tenofsky 2000) but it has also been associated with burns, myocardial infarction, neurological disorders, severe infections, metabolic and electrolyte disturbances, pediatric hematologic malignancies, herpes zoster, and others. There is a male preponderance of ACPO in the literature and the condition is more frequent in older patients. However, this may well reflect the underlying medical conditions and surgical procedures in this patient population. The condition, of course, may be seen at any age and certainly occurs in women as well. In fact, one of the most common antecedent surgeries is cesarean section (Mainguy Le Gallou 2011). So we are not picking on orthopedic surgeons! It just turns out that ACPO is probably more commonly seen after orthopedic procedures.

Clearly, recognition of ACPO is crucial. That is where the **timing of onset** is important from a patient safety perspective. In the study done by Nelson and colleagues (Nelson 2006) on ACPO after lower extremity arthroplasties the onset of symptoms occurred at an average of 3.4 days after the day of surgery (in patients who were on PCA the median onset of symptoms was 2.2 days). In the Chinese study (Zhang 2011) the onset of ACPO after total knee or hip arthroplasty was 2.5 days. In the study done by Tenofsky and colleagues (Tenofsky 2000), which included not only orthopedic cases but multiple other types of surgery, the mean interval from operation to diagnosis of ACPO was 5.1 days. As we have ratcheted down hospital lengths of stay over the years, the time frame of 3-4 days is one in which decisions are often made for discharging such patients either to home or a subacute setting. As above, since the major early symptom is abdominal distension and pain may be minimal and the patients don't look particularly "toxic", one can readily see how such patients might get transitioned to that next level of care before a diagnosis of ACPO is made. Add to that the fact that, in academic settings, the least experienced member of the team may be the one doing most of the discharge interactions. That individual may never have even yet seen a case of ACPO.

Maybe we need to add a blurb about abdominal distension as a possible warning sign in our discharge materials for patients after surgery. More importantly, if the patient tells you he can't buckle his pants because his abdomen is so distended, don't send him home!

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