ACUTE COLONIC PSEUDO-OBSTRACTION
= OGILVIE SYNDROME

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F 이상글
Acute colonic pseudo-obstruction

- = Ogilvie syndrome
  - First described by Sir William Ogilvie in 1948
    - use of this term discouraged d/t ambiguity
  - Many overlapping terms
    - adynamic ileus, pseudo-megaolon, non-mechanical large bowel ileus, intestinal pseudo-obstruction...

- Rare condition characterized by acute colonic dilatation in the absence of mechanical obstruction or extrinsic inflammatory process

- DDx
  - toxic megacolon (inflammatory, infective cause) or chronic intestinal pseudo-obstruction
Epidemiology

- Incidence: rare, 100/10000 inpatients admissions
- Mortality: 9.4% (1998) ~ 6.4% (2011) (d/t over-diagnosis?)
- Colonic perforation in 10-20% → mortality up to 45%
  ✓ risk factor: cecal diameter, duration of dilatation

- Elderly, comorbid patients
  - 50%: Acute illness on a background of chronic disease (cardiac, respiratory, neurological disease)
  - 50%: Post-op (cardiothoracic, orthopedic, abdominal, neurosurgical)
Etiology, pathophysiology

The pathophysiological mechanisms remains unclear

- Autonomic imbalance
  - Colonic reflex arcs
  - Intrinsic colonic dysfunction
  - Chronic disease and pharmacological factors
  - Obstetric causes
  - Metabolic factors
  - Viral enteronerospathy
  - Other hypothesis
Autonomic imbalance

**Most commonly suggested mechanism, Key role**

- **Sympathetic vs. Parasympathetic tone**
  - Relative excess of sympathetic over parasympathetic tone
  - Increased Sympathetic And/Or Reduced Parasympathetic signal

- Sympathetic from paravertebral ganglia
  - Proximal colon appears to have a richer sympathetic innervation

- Parasympathetic supply via vagus nerve (mid gut) or Sacral outflow (hind-gut)

- In ACPO, transition point occurs usually near the **splenic flexure**
  - transition in innervation for both sympathetic & parasympathetic supply
  - Supporting autonomic imbalance as a key step
Autonomic imbalance

- Most patients have **acute** illness → increased **sympathetic** drive → potentially contributing **autonomic imbalance** at the level of colon

- ACPO cannot be reproduced in human or animals by splanchnic or pelvic nerve transection → more complex pathogenesis than excess or deficiency of autonomic activity alone

- Neostigmine (AchE inhibitor)
Colonic reflex arcs

- Several spinal and ganglionic reflex arcs
  - involved in regulating intestinal motor function

- Colonic inhibitory reflex
  - inhibition of proximal colon activity in response to distal colonic distention. Proximal distension also causes a reduction in basal intraluminal pressure in distal colon

- Via afferent mechanoreceptors synapsing with adrenergic efferent neurons in the prevertebral ganglia and spinal cord

- **Success of epidural anesthesia, splanchnic nerve block** as evidence for this mechanism
Intrinsic colonic dysfunction

- **Interstitial cell of cajal (ICC)**: Modulated by the ENS, resulting in the rhythmic contractile activity of intestine

- Despite their importance, **Few studies** were identified specially investigated the role of ICC in ACPO
  - Jain et al, in ACPO, normal number and distribution of ICC, however, affected ICC function remained unknown
  - Choi et al, reported reduction and degeneration of enteric ganglionic cell in resected specimen of patient with pseudo-obstruction, but it is unclear whether these patients had ACPO or CIPO

➔ Important.. But still remains unknown
Chronic disease and pharmacologic factors

- Many ACPO patients are **elderly and have chronic disease**
  - occurring further acute physiologic insult

- The ENS and its extrinsic regulation are affected in several conditions commonly associated with **DM, Parkinson’s disease, Alzheimer’s disease**

- ENS, ICC degenerated **with age**

- Patients with chronic condition are also more likely to be on multiple medication affecting colonic motility
  - including anticholinergics, opiates, CCB, psychotropic drugs,
- clonidine & amitraz (a2 agonist) associated with ACPO
Obstetric causes

◦ The OP most commonly resulting in ACPO = C/sec
◦ Also after normal delivery and instrumental delivery
◦ Preeclampsia, multiple pregnancy, antepartum hemorrhage, placenta previa

◦ However, it remains unclear how..
  ? Compression of parasympathetic plexuses by gravid uterus
  ? Uterus may fall back into pelvis causing mechanical obstruction at RS colon

◦ Pregnancy (↑ progesterone, glucagon) → diminish the tone of large bowel
◦ Prostaglandin (involved in parturition) as a possible contributors to ACPO
Metabolic factors

- A disrupted “milieu interieur” is common in ACPO
  - precipitate or exacerbate the effect of altered autonomic functions or other mechanisms

- Renal failure, Electrolyte disturbances often accompany ACPO
  - whether this is a cause or effect of the pseudo-obstruction
  - Alteration of “K” or other ion \(\rightarrow\) alter ICC pacemaker or smooth muscle activity
  - E’ imbalance has been identified as a predictor of a poor response to neostigmine

- Prostaglandin, cytokines (TNF-a, IL-6, IL-8, IL-1b)
  - not yet been investigated in ACPO

- PG have been implicated in post-op ileus, CIPO, acute small bowel dysmotility, affect ICC function \(\Rightarrow\) no study about ACPO
Viral enteroneuropathy

- Several viral infection
  - Herpes zoster reactivation in low thoracic or lumbar distribution
  - Disseminated zoster
  - Acute CMV
  - Severe dengue

- Mechanism
  - Virus in enteric ganglia may result in a sympathetic autonomic neuritis
  - Local inflammation with afferent stimuli to the sacral nerve roots and blockage of parasympathetic supply
  - Viral spread from dorsal root ganglia may interrupt sacral parasympathetic pathways
  - post-viral dysautonomia
Other hypothesis

- ? Compromised vascular supply to the colon (in early reports)
  ➔ now thought to represent an exacerbating complication rather than cause

- ? “Hinge-kinking” at the transition
  ➔ intra-op, radiological findings generally suggesting a “gradual” transition in colonic caliber

- “air-fluid lock syndrome” and colonic distension d/t aerophagy in chronic respiratory disease
<table>
<thead>
<tr>
<th>Category</th>
<th>Risk factors</th>
</tr>
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<tbody>
<tr>
<td>Surgical</td>
<td>Cardiac surgery, solid organ transplantation, major orthopaedic surgery, spine surgery</td>
</tr>
<tr>
<td>Cardiorespiratory</td>
<td>Shock, myocardial infarction, congestive heart failure, chronic obstructive pulmonary disease</td>
</tr>
<tr>
<td>Neurological</td>
<td>Dementia, Parkinson’s disease, Alzheimer’s disease, stroke, spinal cord injury</td>
</tr>
<tr>
<td>Metabolic</td>
<td>Electrolyte imbalance, diabetes, renal failure, hepatic failure</td>
</tr>
<tr>
<td>Medications</td>
<td>Opiates, anti-Parkinson agents, anticholinergics, antipsychotics, cytotoxic chemotherapy, clonidine</td>
</tr>
<tr>
<td>Obstetric/gynaecological</td>
<td>Caesarean section, normal vaginal delivery, instrumental delivery, preeclampsia, normal pregnancy, pelvic surgery</td>
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<tr>
<td>Infectious</td>
<td>Varicella-zoster virus, herpes virus, cytomegalovirus</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>Major burns/trauma, severe sepsis, idiopathic</td>
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Figure 1 Pathophysiological factors that have been implicated in the development of acute colonic pseudo-obstruction. ICC: Interstitial cells of Cajal; ENS: Enteric nervous system.
Clinical presentation

- Elderly + multiple comorbidity + recent Op Hx

- Sx
  - Abdominal pain, distention, N/V
  - Inability to pass flatus and stool (common but not invariably present)
  - Diarrhea (hypersecretion of water)
  - Fever in 78% pt. with ischemic perforated bowel, 31% pts with viable bowel

- P/Ex
  - Significant abdominal distention with tympany, high-pitched sound or absent sound
  - Abdominal Td (ischemic bowel or perforation)
Diagnosis

- Dx of exclusion, **rule out any mechanical obstruction**
- Lab test: WBC, CRP, E' . . .
- Diagnostic colonoscopy: **NOT advised, not helpful**
- Radiologic study: X-ray, CT
  - rule out cecal or sigmoid volvulus, other obstructing lesion
  - perforation, small bowel obstruction
  - cecal diameter (9-12cm) → impending perforation
  - **CT: ESSENTIAL in assuring no source of mechanical obstruction**
- Typical CT finding
  - **proximal colonic dilatation with a transition point at the level of the splenic flexure**
- Gastrograffin (water-soluble contrast agent)
Complication and Maximal cecal diameter

- **Colonic perforation 15-20%, Mortality 40-50%**

- CT: pneumoperitoneum, free peritoneal fluid, pneumatosis intestinalis
  → strong suspicion of colon perforation, urgent laparotomy

- Maximal tolerable diameter of cecum: 9cm-12cm

- **Poor prognosis factor**
  - Age, ischemia, Cecal perforation, delay of more than six days in colonic decompression
Treatment

1. Conservative treatment
2. Medical therapy
3. Endoscopic therapy
4. Surgical therapy
Conservative treatment

- Decompression: fasting, NG tube, Rectal tube
- **IV fluid, Electrolyte correction** (K, Mg)
- **Discontinuation of medication**
  - anticholinergics, atrophinics, antihypertensive, anti-Parkinson med, antidepressant, neuroleptics, opiates, clonidine
- Osmotic laxative: contra-indicated (fermentation, gas distention↑)
- **Position**: Ambulation, Knee-chest position or Rt/Lt decubitus

- Successful in **70%** (by Wegner)
- Should **not** be continued beyond **3 days**
  - Beyond a delay of six days → increased risk of perforation

- Effectiveness: Abdominal distention↓, Gas passing/stool passing, Cecal diameter↓
Pharmacologic treatment

- **Neostigmine**, Statistically significant more effective than placebo (3 RCT)
  - Reversible cholinesterase inhibitor
  - 91% responded to a single IV neostigmine 2mg (Ponec et al)

- Administration
  - 2-2.5mg IV bolus over 3-5min
    - colonic motility within 20-30min, success rate 80%
  - 2nd/3rd bolus can be administered
  - infusion pump: 0.4-0.8mg/h over 24hr

- Effectiveness of neostigmine
  - 64~91% after 1st dose
  - 40%~100% after 2nd dose

- Recurrence
  - up to 38%
Pharmacologic treatment

- **Contraindication of neostigmine**
  - acute urinary retention
  - gastro-duodenal ulcer
  - acute coronary syndrome
  - Acidosis
  - asthma, bronchospasm
  - bradycardia, b-blockage therapy
  - renal insufficiency
  - mechanical bowel obstruction, colonic perforation
Pharmacologic treatment (기타)

- Oral administration of PEG: to prevent recurrent ACPO
- Grastrografin enema: hyperosmotic water-soluble contrast agent, laxative properties
  - Effective in 78%; mean decrease of 4.6cm in cecal diameter

- Stimulant of motility: cannot be recommended
  - Erythromycin, success rate is only 40%/recurrence 50%
  - Tegaserod, nicotine patches, metoclopramide, indomethacin, ibuprofen – cannot be recommended
Epidural anesthesia

- **Sympathetic hypertonia** is partly responsible for the onset and persistence of megacolon
- Sympathetic nerve blockage creates splanchnic vasodilatation, interrupt the neural flow of inhibitory pain receptors
Colonoscopic exsufflation

- First performed in 1977
- Difficult (lumen is filled with stool, residue of contrast)
- Risk of insufflation required to insert the colonoscopy → perforation risk
- To detect ischemia (requiring surgical treatment)

- No preparation is required
- Sedated with benzodiazepine but narcotics should be avoided
- The colonoscope can be passed Rt colon in 85%, but not absolutely necessary to reach the cecum
  - If the hepatic flexure cannot be turned, exsufflation starting in the transverse colon is often sufficient
- Demonstration of ischemic colonic mucosa requires that endoscopy be terminated and converted to surgery
Colonoscopic exsufflation

• Effectiveness (in retrospective study)
  • Decreased cecal diameter: 12.8cm → 8.7cm (strodel et al) (P<0.01)
  • Immediate success varied fro 61% ~ 95%
  • recurrence ACPO may be as high as 40%
  • perforation 2%, mortality 1%

• Definition of successful endoscopic exsufflation
  • Reduction of the cecal diameter by at least 3cm

• Placement of a long multi-perforated large-bore drainage tube
  • to prevent recurrence, flushed every 4-6 hr
  • Instillation of PEG also useful in preventing recurrence
Percutaneous cecostomy

- Percutaneous cecostomy guided by either radiology or colooscopy has been reported in literature but cannot be recommended for general usage at this time
  - percutaneous endoscopic cecostomy (PEG) has a complication rate of 40% (abscess, bleeding, hematoma, perforation, stomal retraction)

NOT recommended
Surgery

- Surgery is the treatment of last resort
  - Only when above-mentioned therapies have failed
  - or there are clinical or radiological indications of perforation

- Colonic ischemic and perforation occurs in 3-10% pts
  - who have risk factors including cecal diameter > 12cm, duration of dilatation > 6 days

- Tube cecostomy, cecostomy, colostomy
  - determined on a case-by-case basis
Figure 3. Decisional algorithm for management of acute colonic pseudo-obstruction (ACPO). PEG: polyethylene glycol.
Reference


