❖ Bowel obstructions:

- Can be due to : Adhesions, Hernias, Tumors.
- If there is obstruction, fluid and gas collect causing problems.[57]
- Diagnosis:
  A. Symptoms: Abdominal pain, distension, constipation (if colon obstruction), N/V (small bowel).
  B. Examination:
     - Palpation: Tenderness, distension, guarding, rigidity, rebound (if there is peritonitis).
     - Auscultation: aggravated bowel sounds.
     - Rectal exam: Rectal dilation[58].

  C. Investigation:
     - CT scan with IV contrast is the investigation of choice. It gives 3 important information:
       1. Site (small vs. large bowel).
       2. Complete vs. partial obstruction.
       3. The anatomy of the obstruction (hernia vs. intussusception, volvulus, tumor).

     - Plain X ray: showing multiple air-fluid-level[59].
     - Barium studies: contraindicated if there is suspicion of bowel obstruction (it could aggravate an existing obstruction).
     - Colonoscopy: is contraindicated. In order to see the bowel wall air is injected, leading to bowel perforation in an obstructed bowel.

Resuscitation: done before CT, Suppose a pt presents w/ 5 days Hx of classic obstructive Sx !
1. Pass **NGT** (to avoid aspiration and further inhalation of air into the stomach).
2. **Foley** catheter (to monitor fluid input/output).
3. 2 large **IV** lines. Give bolus (usually requires 5 boluses, if patient is old give 3)
   - Once the patient is stable, then send for CT scan.

- Tx:
  - Is based on the CT results and differs from large vs. small bowel, complete vs. partial, simple vs. complicated/rotational (e.g. volvulus with blood supply compromise).
  - Observation: continue NGT and IV fluids and observe the patient until the patient gets better and obstruction to be relieved. For partial obstruction, simple/non-rotational.
  - If the decision of operating is made it is usually a laparotomy. For complete, rotational (volvulus).

[57] Fluid and air collects above the site of obstruction (i.e. air swallowed into the stomach, fluid as in saliva, gastric juice, pancreatic juice, bile and intestinal juice). How much fluid is produced in the intestines? 6L. Almost half of the intestinal fluid is absorbed leaving about 2-3L of fluids to go into the colon.
[58] Normally the rectum encircles the examiner's finger, suppose there is obstruction in the transverse colon, the whole segment above the obstruction will be dilated (brain order the segment to be dilated, however; this order is delivered to the entire GI tract, from the oral cavity to the anus) meaning, the rectum will also dilate.
[59] Normally there are 3-4 air fluid levels. >4 is suspicious, 9-10 indicates obstruction. But if you are already suspecting obstruction (from Hx & PEx) X-ray will not add anything to your knowledge; therefore, there is no role of X-ray in diagnosing obstruction.

➔ Small Bowel Obstruction: (3 options)

1. Small bowel adhesions: Cut any adhesions and relieve obstruction (adhesiolysis).
2. Dead small bowel: Resection and anastomosis.
3. Resection and delayed anastomosis: Old patient with multiple comorbidities with suspicion that anastomosis will not heal —> resection without anastomosis[60].

➔ Large Bowel Obstruction: (2 options)

1. Large bowel adhesions (adhesiolysis).
2. Resection & stoma with delayed anastomosis (Hartmann procedure)[61].

★ Anastomosis of the colon cannot be done in an emergency (unprepared bowel), in elective surgery colonic preparation is done.

- Colonic preparation for anastomosis:
  - Must clear out stool and microorganisms.
  - Mechanical preparations: causing severe diarrhea (3-4 Hrs. to empty the colon).
  - Microbial preparation: Metronidazole (Flagyl).
  - Small bowel does not require preparation because it does not contain microorganisms, except E.Coli in the terminal ileum.

★ Exceptions in large bowel obstruction where colonoscopic stenting can be done:

1. Obstructed sigmoid cancer patient:
   - A stent can be passed by colonoscopy in the lumen, the stent is self-expanding allowing fluid and gas to pass and clear the obstruction.
   - Beware of perforation; surgical team is ready to interfere in case of perforation and Hartmann is done.
   - If stenting is successful —> admit for 3-4 days, prepare the colon, CT scan and tumor markers with staging is done then treat according to the stage of the tumor.
   - All obstructed colorectal cancer patients currently are being stented, unless there is perforation Hartmann is done.
2. Sigmoid volvulus, If the endoscopist is able to pass a stent in the volvulus ! relieved obstruction ! patient can be treated electively.

[60] Leave the distal part, and bring the proximal part as an ileostomy. Anastomosis and closure of the stoma is done 3 months later.
[61] Resection and primary anastomosis is not done in the large bowel, anastomosis in an emergency resection will never heal due to the content of gas increasing the pressure inside, and anaerobes in stool digest the suturing material resulting in disruption and leaking.