

A 15-day-old boy is brought to the emergency department for evaluation of 2 episodes of "green" vomit that began this morning. The boy has been exclusively breastfed since birth but has shown little interest in feeding over the past 24 hours. He was born full-term by uncomplicated vaginal delivery and had an uneventful nursery course. He passed meconium on the first day of life and has had normal daily stools. The boy's temperature is 36.7 C (98 F), blood pressure is 85/50 mm Hg, pulse is 142/min, and respirations are 46/min. Examination shows an irritable boy with dry mucous membranes. The abdomen is soft and mildly distended. A nasogastric tube is placed for decompression and intravenous fluids are started. Abdominal x-ray shows a gasless abdomen. Which of the following is the most appropriate next step in the management of this patient?

- ☐ A. Abdominal ultrasound
- ☐ B. Contrast enema
- ☐ C. CT scan of the abdomen
- ☐ D. Serial abdominal x-rays
- ☐ E. Upper gastrointestinal series

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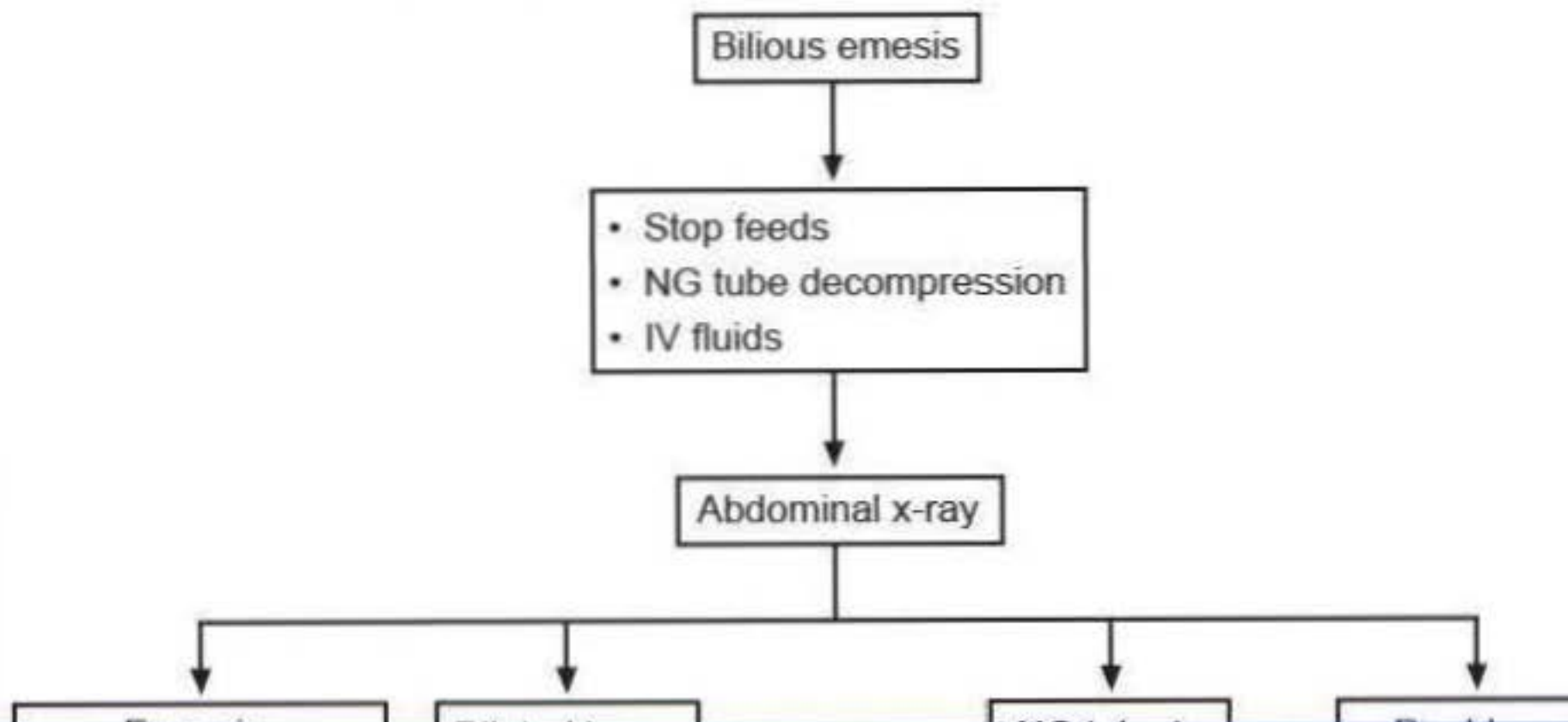
- ☐ A. Abdominal ultrasound [32%]
- ☐ B. Contrast enema [20%]
- ☐ C. CT scan of the abdomen [10%]
- ☐ D. Serial abdominal x-rays [6%]
- ☒ E. Upper gastrointestinal series [32%]

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Explanation:

User Id: [REDACTED]

Evaluation of bilious emesis in the neonate

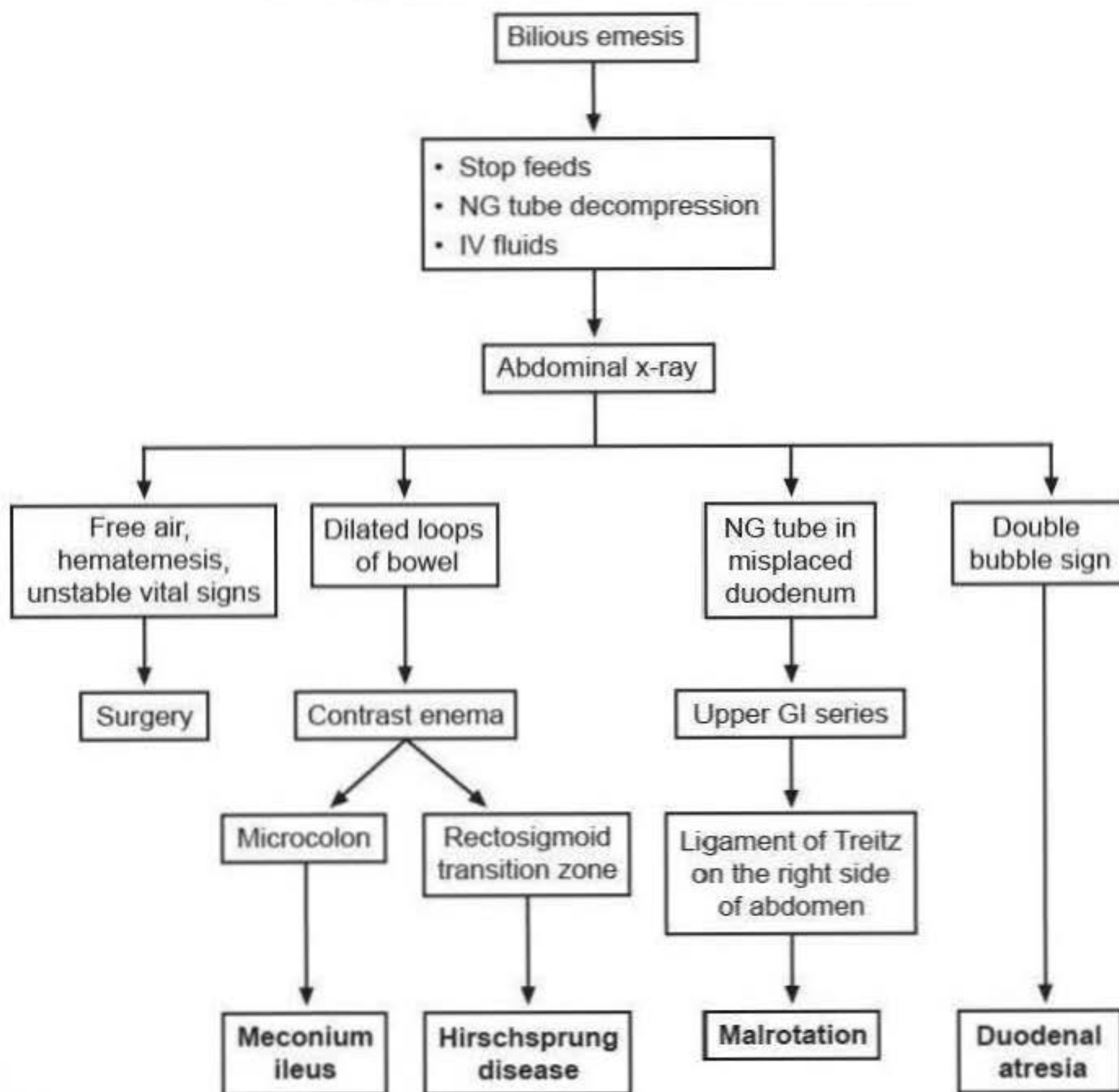


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Explanation:

User Id: [REDACTED]

Evaluation of bilious emesis in the neonate



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The primary predisposing factor for volvulus in children is **malrotation** of the midgut during early fetal development. **Midgut volvulus** classically presents in a neonate (age <1 month) with **bilious vomiting**. Initially, the abdomen is soft and not distended, but

The primary predisposing factor for volvulus in children is **malrotation** of the midgut during early fetal development. **Midgut volvulus** classically presents in a neonate (age <1 month) with **bilious vomiting**. Initially, the abdomen is soft and not distended, but ischemia of the twisted bowel can cause bloody stools, bowel perforation, abdominal distension, and peritonitis. Signs of ischemia or systemic decompensation (ie, shock) are an indication for emergency laparotomy.

The evaluation of clinically stable neonates with **bilious emesis** begins with cessation of enteral feeds, nasogastric (NG) tube decompression, and intravenous (IV) fluids. An **x-ray** is generally the first step to rule out **pneumoperitoneum**, which would reflect intestinal perforation and immediate need for emergency surgery. Rarely, the diagnosis may be suspected if the NG tube terminates in the abnormally-placed duodenum, but x-ray is usually nonspecific for midgut volvulus.

If there is no evidence of free air and the bowel gas pattern is not suggestive of duodenal atresia ("double bubble") or distal obstruction (dilated loops of bowel), then an **upper gastrointestinal (GI) series** (eg, barium swallow) should be performed. An upper GI series is the fastest and most accurate method of diagnosing malrotation with midgut volvulus. The finding of the **Ligament of Treitz on the right side of the abdomen** reflects malrotation while contrast in a **"corkscrew" pattern** indicates **volvulus**.

Surgery must be expedited to prevent catastrophic complications. If present, the volvulus is reduced. The **Ladd procedure** consists of fixing the bowel in a non-rotated position to minimize recurrent volvulus risk.

(Choice A) Pyloric stenosis is most commonly seen in boys age 1-2 months with non-bilious projectile vomiting. Classic findings include visible peristaltic waves and a palpable abdominal mass. Abdominal ultrasound is the preferred imaging modality for pyloric stenosis but is not sensitive for midgut malrotation (high risk of false-negative results).

(Choice B) **Hirschsprung disease** and **meconium ileus** usually present with failure to pass meconium within the first 2 days of life and dilated loops of bowel on x-ray. These diagnoses should be evaluated by contrast enema. However, contrast enema has unacceptable rates of false positive and negative results in the evaluation of malrotation.

(Choice C) Although a CT scan is often used in adults with suspected surgical abdomen, it is generally avoided if possible in infants and children due to significant radiation exposure. X-rays and fluoroscopy (ie, upper GI series) use less radiation.

(Choice D) Serial abdominal x-rays are used in infants to follow the progression of non-surgical conditions such as ileus or mild cases of necrotizing enterocolitis.

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(Choice C) Although a CT scan is often used in adults with suspected surgical abdomen, it is generally avoided if possible in infants and children due to significant radiation exposure. X-rays and fluoroscopy (ie, upper GI series) use less radiation.

(Choice D) Serial abdominal x-rays are used in infants to follow the progression of non-surgical conditions, such as ileus or mild cases of necrotizing enterocolitis. However, serial x-rays have no role in suspected surgical conditions like volvulus, where waiting for follow-up images may cause delays in treatment.

Educational objective:

Malrotation with midgut volvulus usually presents in neonates with bilious vomiting and abdominal distension. Untreated volvulus can progress to frank bowel ischemia, bloody stools, and perforation. An upper gastrointestinal contrast study is the gold standard for diagnosing malrotation.

References:

1. **Malrotation and midgut volvulus: a historical review and current controversies in diagnosis and management.**
2. **Surgical concerns in malrotation and midgut volvulus.**

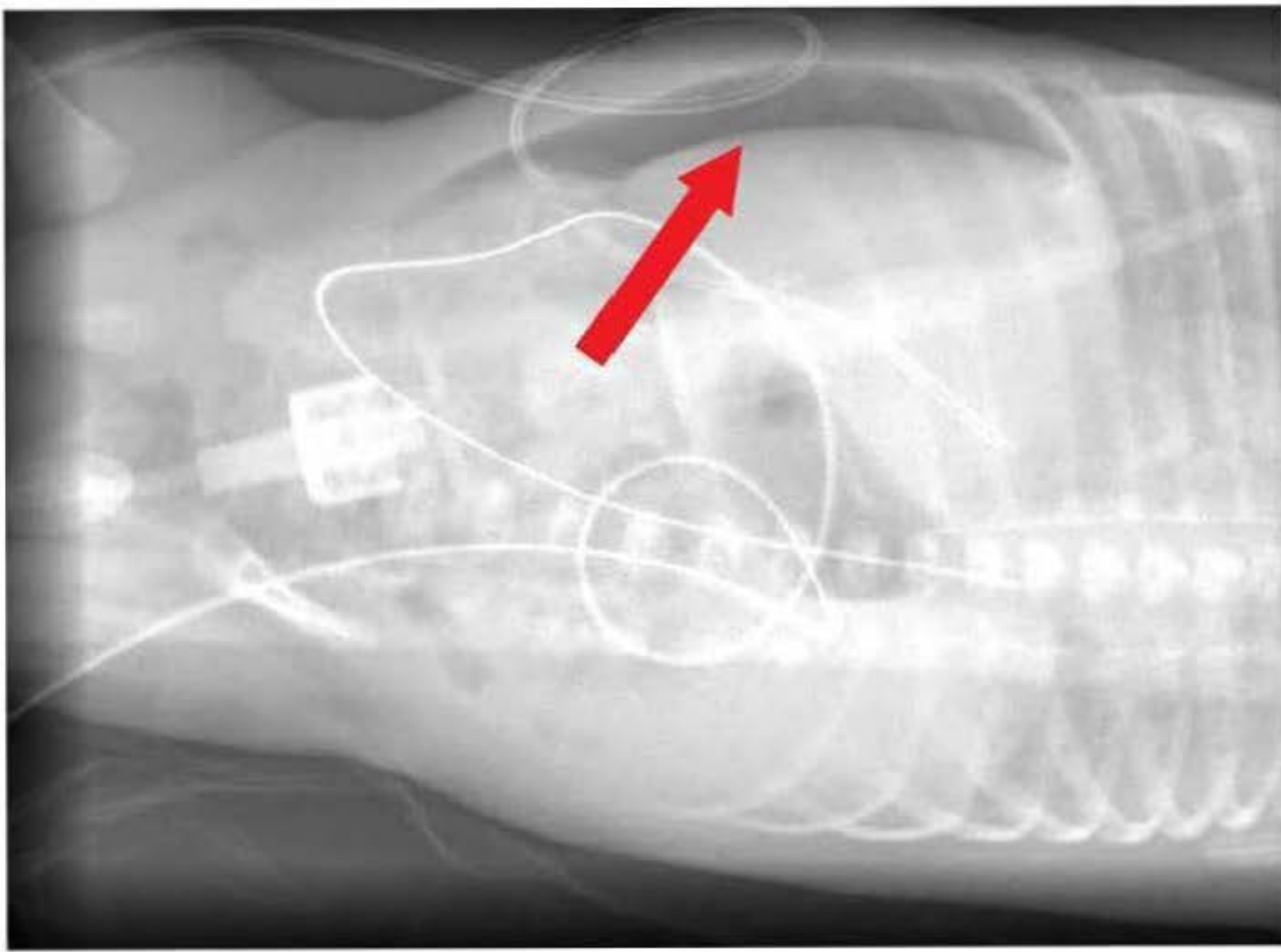
Media Exhibit

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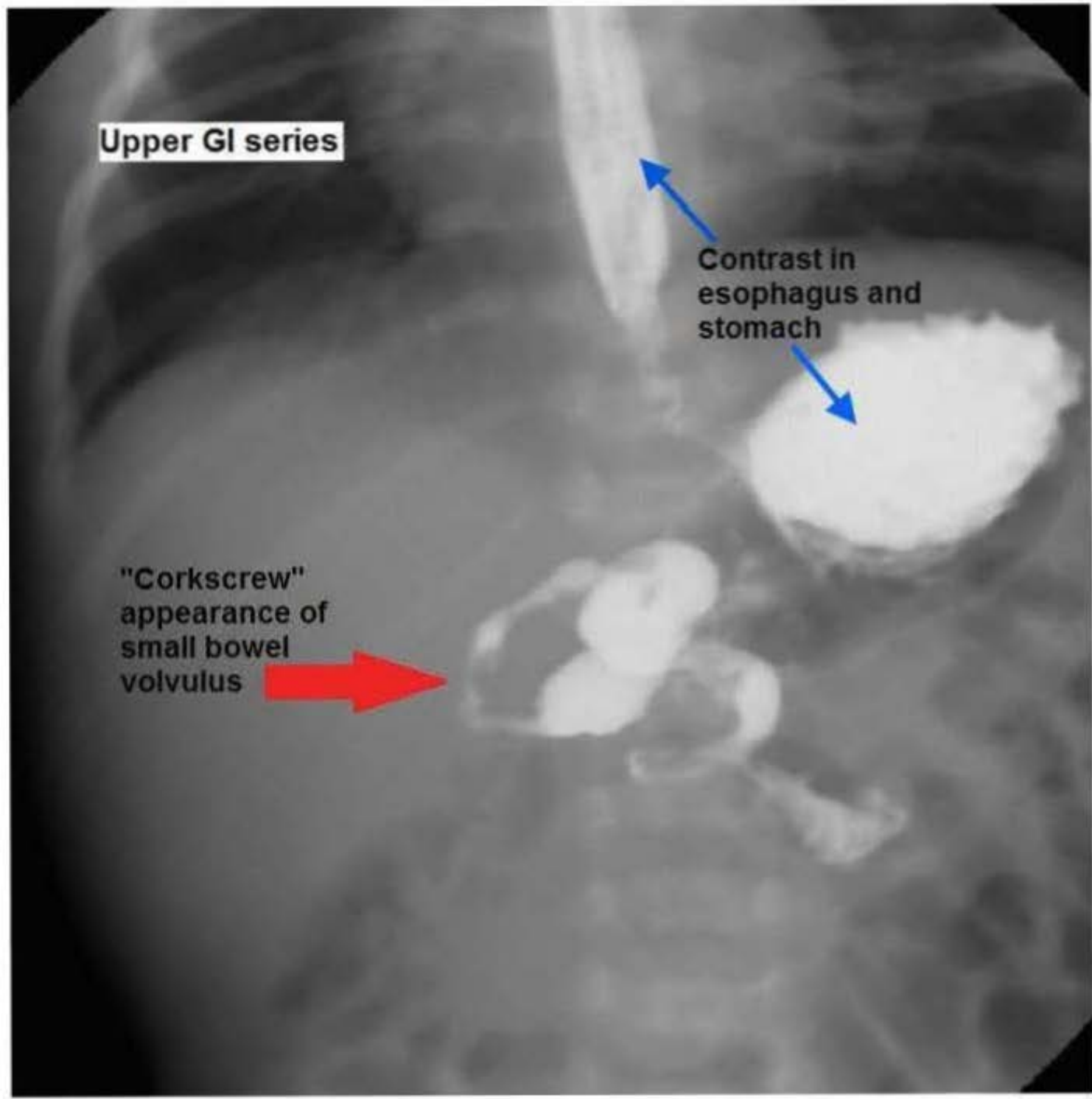
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Peritoneal Air



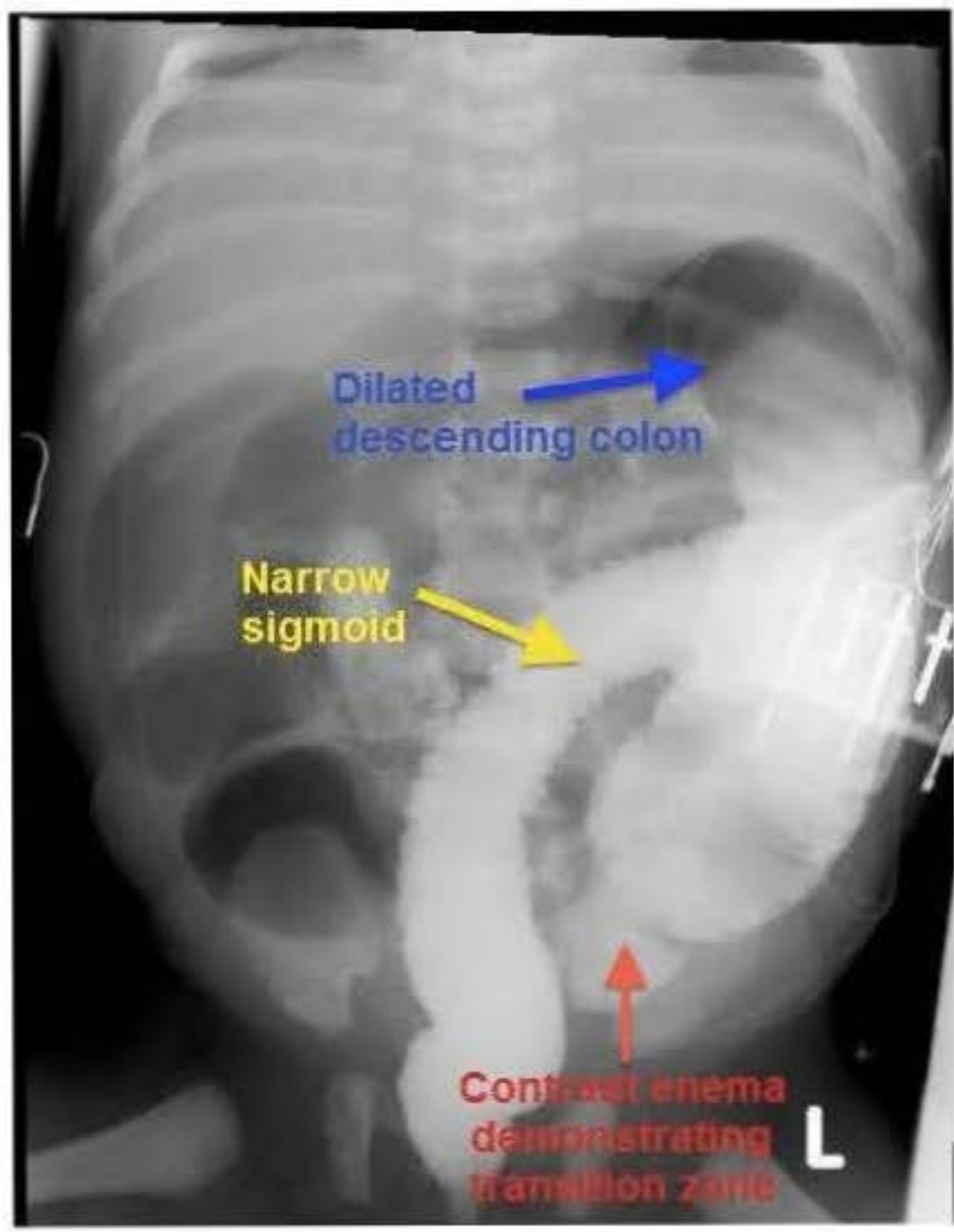
Media Exhibit

volvulus



Media Exhibit

ing disease



Media Exhibit

m ileus



Contrast enema
demonstrating
microcolon