

Assessment of life threatening sulphuric acid ingestion using computed tomography imaging

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Background

CT imaging is recognised increasingly as an alternative to endoscopy in patients who have ingested corrosive agents,¹ particularly if endoscopy is considered inappropriate.

A 42-year-old woman was brought into the emergency department by police officers following deliberate ingestion of an unknown quantity of 91 % sulphuric acid. She presented with profuse haematemesis, the vomitus being sufficiently corrosive to burn through the uniform of the accompanying policemen. She sustained a cardiac arrest soon after arrival, was resuscitated and transferred to intensive care. Chemical burns were present to the face, vocal cords, eyes, and arms.

Clinical judgment by the attending surgeons and intensivists was that early endoscopy would not add useful information relevant to initial management. The plan was to delay endoscopy for one week, but following clinical deterioration and advice from the National Poisons Information Service, CT imaging with contrast was performed 36 hours post ingestion.

While the oesophagus appeared grossly normal, the fundus, body and antrum of the stomach were not visualised and the majority of the spleen was infarcted. The pylorus was preserved (Fig. 1-3).

Emergency laparotomy at 41 hours post ingestion revealed some 2L of pungent fluid in the abdominal cavity requiring repeated irrigation to avoid corrosive injury to the surgical team. A clear demarcation of coagulative necrosis was evident proximal to the pyloric antrum with complete sparing of the pylorus and distal GI tract (Fig. 4). The remainder of the stomach was necrotic and perforated, with a necrosed spleen and corrosive burns of the anterior abdominal wall and left hemidiaphragm (Fig. 4-5).

Total gastrectomy with truncation at the gastro-oesophageal junction was performed with splenectomy and feeding jejunostomy. Upper gastrointestinal endoscopy revealed severe scarring of the pharynx and oesophagus with displacement of a heavily scarred epiglottis. Tracheostomy was performed on day seven.

At four months, despite intensive therapy and return of cough and speech, the patient could clear secretions but could not swallow. The reconstruction required to enable swallowing and refeeding would have involved loss of the larynx, and the patient opted to preserve verbal communication and accept permanent feeding via jejunostomy.

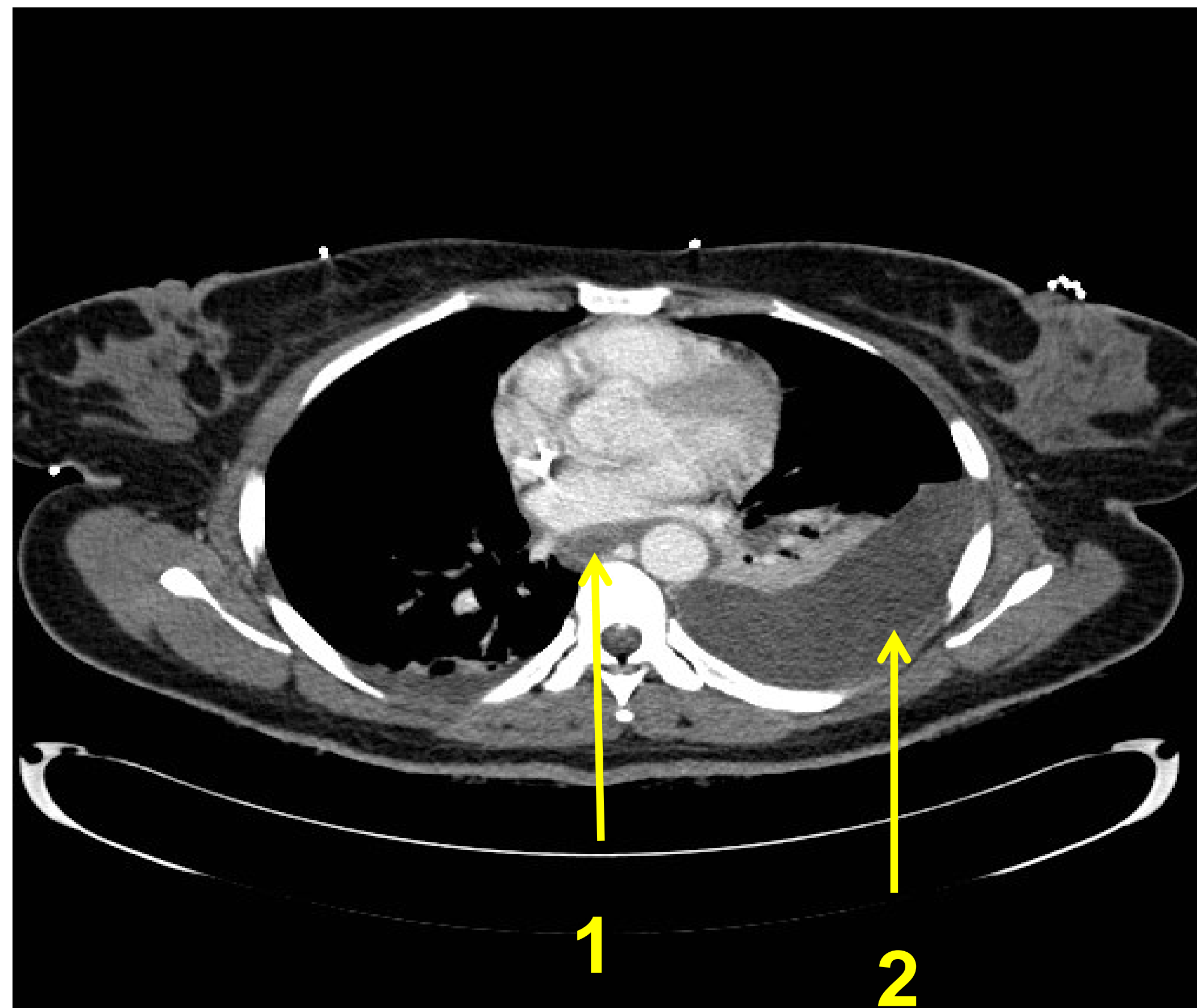


Fig. 1. CT cross-section at level of distal thorax

1. Patent distal oesophagus in the thorax
2. Pleural effusion

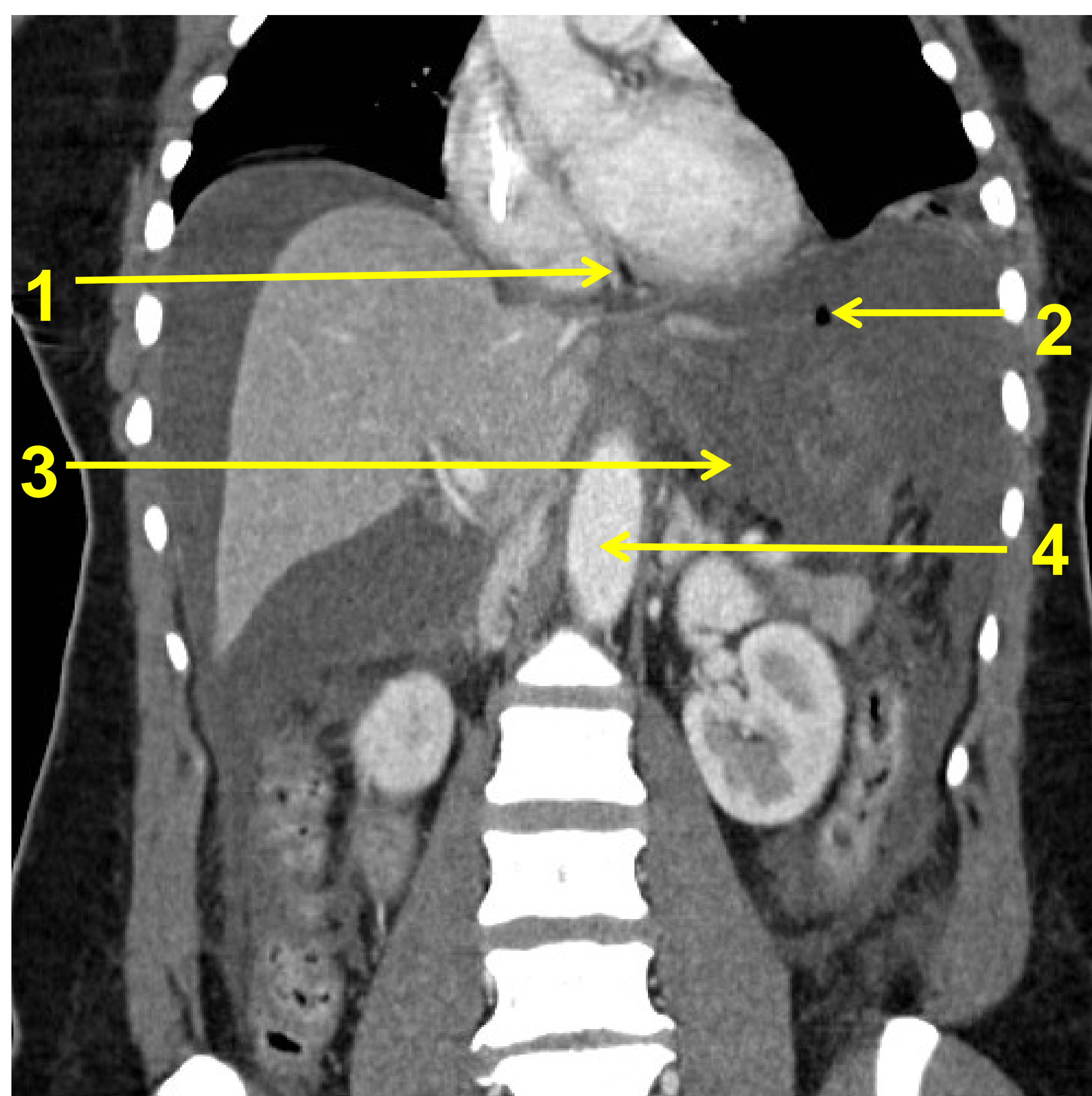


Fig. 2. CT coronal section of abdomen

1. Thoracic oesophagus leading to absent stomach
2. Free gas locule confirming visceral injury
3. Absent stomach and non-enhancing spleen
4. Enhancing aorta

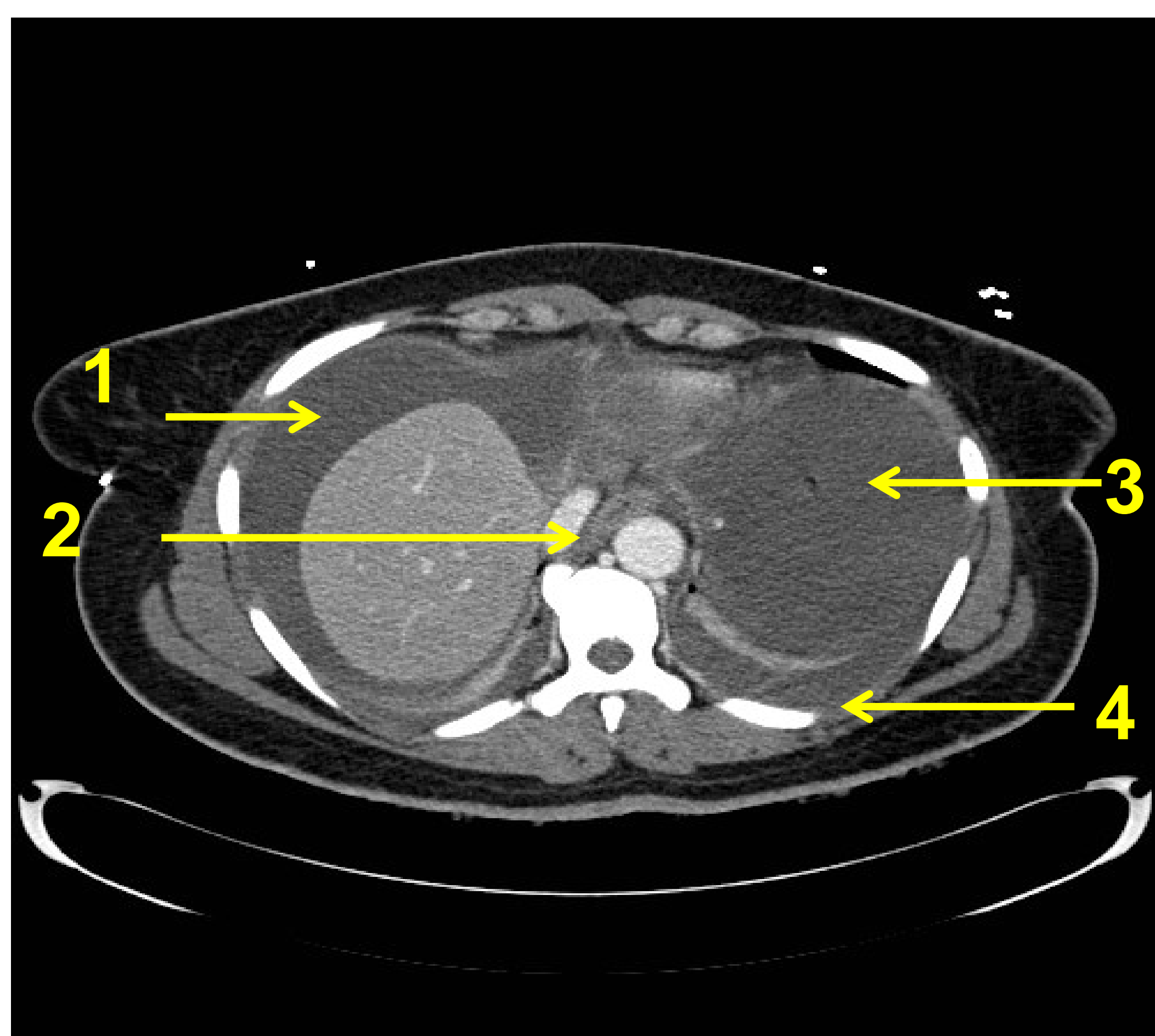


Fig. 3. CT cross-section at level of oesophageal hiatus

1. Ascites
2. Oesophagus patent
3. Stomach not visible
4. Non-enhancing spleen

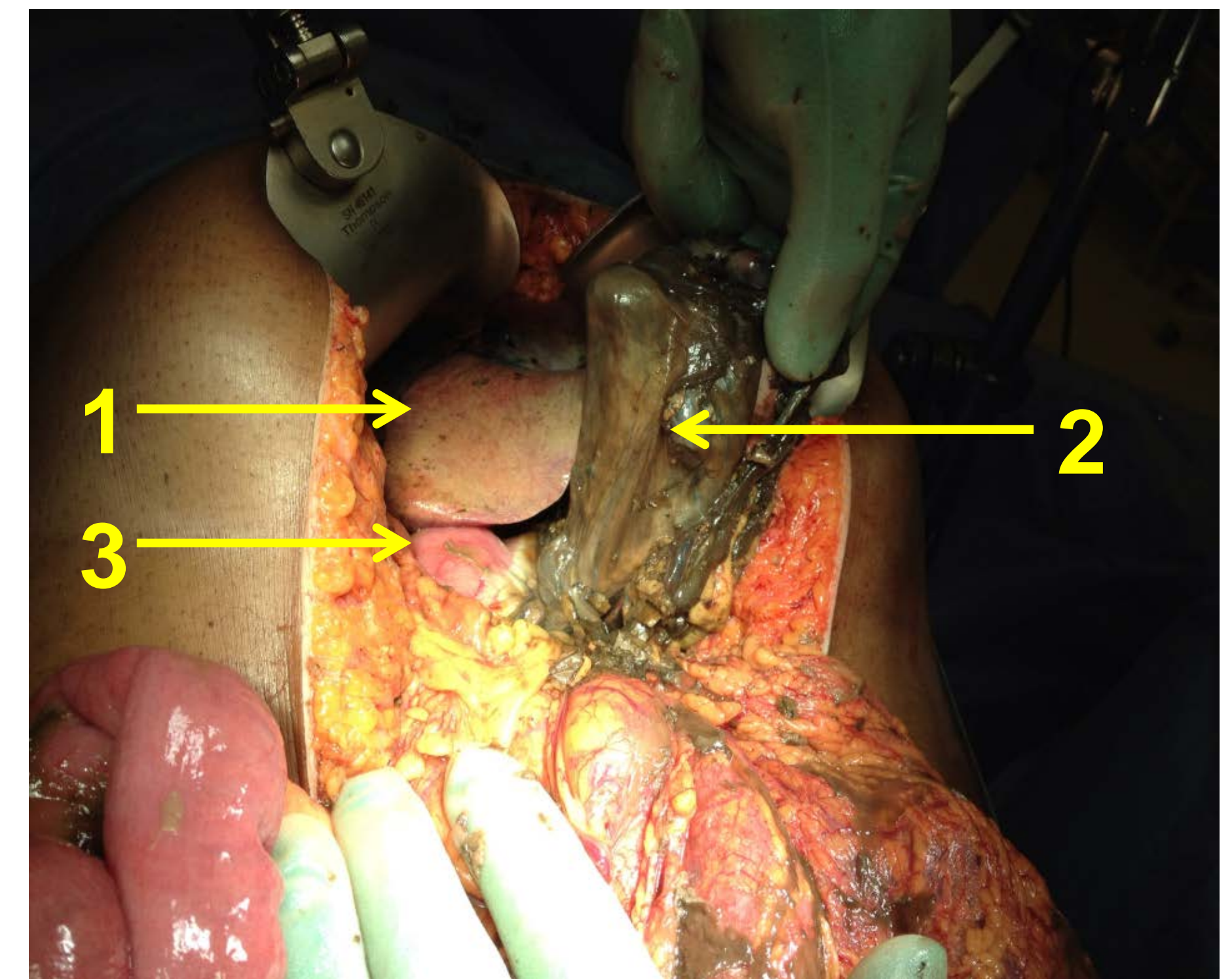


Fig. 4. Intraoperative findings

1. Liver
2. Stomach dissolved
3. Preserved gastric antrum

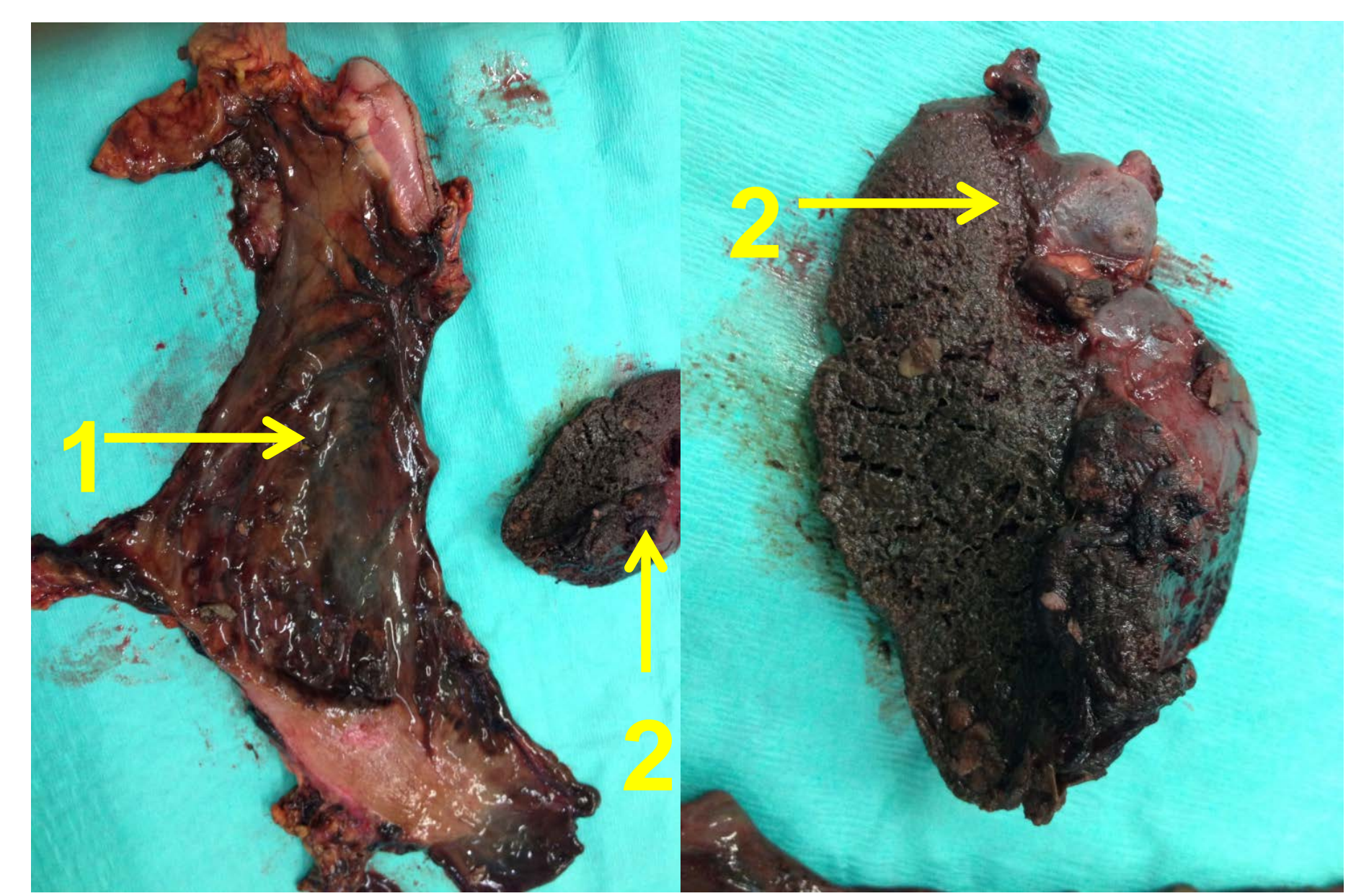


Fig. 5. Organ injury

1. Perforated stomach
2. Necrotic spleen

Discussion

Patients who have ingested a large amount of a corrosive substance present a major clinical challenge. Early assessment of injury within 24 hours is vital, and endoscopy is considered the diagnostic gold standard when performed within 24 hours. Where gastrointestinal perforation is suspected, and therefore endoscopy contraindicated, CT offers a rapid non-invasive alternative primary investigation.

While CT may underestimate the severity of injury when performed within 48 hours of exposure,² it is more valuable than endoscopy in assessing threatened or established gastric perforation and thus the necessity for emergency surgical intervention.³

Conclusion

When endoscopy is not possible, CT imaging is highly valuable in the assessment of patients who have ingested concentrated acids.

References

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