Gastric perforation after liquid nitrogen ingestion

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INTRODUCTION

• An 18 year old female consumed an alcoholic drink containing liquid nitrogen used to create a ‘smoking’ effect
• The severity of the resulting injury necessitated total gastrectomy
• The drink was on sale in licensed premises and such recipes are also freely available on the internet

The Injury

• Oesophagogastroduodenoscopy did not show any thermal injury to the oesophagus
• There was a 4cm perforation on the lesser curve of the stomach surrounded by a large area of necrosis and haemorrhage
• This injury could not be closed primarily and a total gastrectomy with Roux-en-Y reconstruction was performed
• She was discharged 15 days post operatively but will need lifelong nutritional support

Mechanism of injury

With a boiling point of -195°C liquid nitrogen can cause severe thermal burns. It has an expansion ratio of 1:694 on vapourisation which leads to a rapid increase in volume

Absence of thermal injury to the oesophagus does not seem to support thermal injury as the major cause of visceral perforation, although it may have contributed to it

The large volume of gas within the peritoneum suggests barotrauma, resulting from the rapid increase in volume on vapourisation of the liquid, as the primary mechanism of injury

Previous cases of ingestion reported in the literature(1-4) seem to support barotrauma as the primary mechanism of injury

The lesser curve is commonly the site of perforation and appears to be particularly vulnerable to barotrauma(5)

CONCLUSION

• Emergency departments and acute surgical units need to be aware of the potential for such injuries to occur
• Surgeons facing this type of injury need be aware of the potential for major trauma and consider preoperative involvement of specialist oesophago-gastric colleagues
• Public health bodies must monitor the increasing use of liquid nitrogen in alcoholic drinks and do more to alert the public to the potential dangers
• We propose the need to consider regulatory action to restrict the use of liquid nitrogen in this way to prevent any further morbidity or even mortality

References