Clinical Observation

Complications of the Cut-and-Push Technique for Percutaneous Endoscopic Gastrostomy Tube Removal

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The use of the “cut-and-push” technique for percutaneous endoscopic gastrostomy (PEG) removal has been recognized since 1991. This technique is used in patients who are thought to have no risk of distal adhesions or strictures. Its use in selected patients is supported by current British Society of Gastroenterology guidelines. However, the risk of complications has long been debated. This report describes a patient who developed complications as a result of PEG removal using the cut-and-push technique. The patient had undergone previous abdominal surgery, and removal of the PEG endoscopically was not possible. A barium follow-through was performed in light of the history, and it excluded any mechanical blockage. Follow-up x-ray showed passage of the remnant beyond the pylorus. Despite this, the remnant became lodged in the small bowel, eventually resulting in perforation and death. This case highlights the fact that impaction of the remnant can occur in patients without evidence of mechanical obstruction on investigation. This raises a question about the need for serial x-rays to ensure passage of the remnant if the patient cannot confirm this visually. (Nutr Clin Pract. 2011;26:230-231)

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“Cut-and-push” as a removal technique has been used since the early 1990s, but the risk of complications has since been debated. In 2009, Kejariwal et al., after conducting a single-center retrospective review of all percutaneous endoscopic gastrostomy (PEG) removals over a 5-year period, concluded that the cut-and-push method of Freka tube (Fresenius Kabi Ltd, Cheshire, UK) removal was safe. The investigators also stated that abdominal x-ray (AXR) follow-up was not routinely indicated.

Fresenius, the manufacturers of Freka tubes, recommends endoscopic removal. However, this is impossible in some individuals. It is an accepted UK practice to use the cut-and-push removal in these cases.

Our case highlights that this method is not always safe. An elderly woman had a 15F Freka tube, with a semirigid internal bumper, removed by the cut-and-push method in a UK hospital with fatal consequences. A planned endoscopic PEG exchange was unsuccessful because of an impassable, untreatable esophageal stricture. Once a barium follow-through study confirmed no mechanical blockage, the PEG was removed by the cut-and-push method. An AXR 1 week later showed the remnant beyond the pylorus and a new tube in situ (Figure 1). The patient was advised to return if the remnant failed to pass or any complications arose.

The patient presented as a surgical emergency 8 months later, following 6 weeks of increasing abdominal pain. Abdominal examination revealed guarding. Laboratory investigations demonstrated only anemia. Admission AXR was reported as normal. However, subsequent review showed the remnant overlying the pelvis. The patient was treated conservatively, with intravenous antibiotics and fluids. On the third day, she rapidly deteriorated with evidence of shock and peritonitis. She died before an emergency laparotomy could be performed.

Postmortem examination confirmed the cause of death as peritonitis due to perforation of the small bowel by the cut PEG tubing (disc with 1.5 cm of tubing
Complications associated with PEG removal are rare but potentially life-threatening. An early prospective study reported no significant complications during a 153-day follow-up. Since 1991, complications have been reported in adult patients following cut-and-push, with bowel obstruction and perforation being the most frequently reported. More unusual occurrences have included enterovaginal fistula and ileostomy perforation.\textsuperscript{2,3}

Previous studies recommended that patients not reporting remnant passage by day 7 have an AXR. Merrick et al\textsuperscript{4} repeated the AXR at 2 weeks if the remnant was present on initial x-ray but then not seen to pass. Only 1 of 42 patients required follow-up x-ray. Therefore, Merrick et al concluded that AXR follow-up was unnecessary in any patient. In an older study of 57 patients, 14% imaged still had a visible remnant at days 7-14 and the range for PEG elimination was reported as 4-16 days. Our case demonstrates that simply confirming that the PEG remnant has passed through the pylorus is insufficient, because the remnant can still cause distal obstruction. It is important that patients be suitably advised on the need to actively look for passage of the PEG remnant following a cut-and-push procedure.

Kejariwal et al,\textsuperscript{1} whose results supported cut-and-push, limited follow-up to 30 days. This is significantly shorter than the time to complication for our case.

In the Merrick et al\textsuperscript{4} study, cut-and-push was not used in any patients with previous abdominal surgery. Therefore, conclusions cannot be drawn about safety in this cohort of patients. The majority of PEG patients have multiple comorbidities, and a significant number will have had previous abdominal surgery. Barium studies cannot be used to accurately predict those patients who have undergone surgery previously and will encounter difficulties passing the PEG remnant, as highlighted in this case. This reconfirms that cut-and-push should be used with caution in patients with a history of previous abdominal surgery.

In the United States, the use of PEGs with an internal molded bolster or balloon is common. These are suitable for percutaneous traction removal but may require endoscopic removal. There are occasions when the tube remnant inadvertently passes into the small bowel, and measures must be taken to ensure that the remnant does not become impacted, as in the case presented.

**Conclusion**

In the majority of patients, the cut-and-push method is a viable option for gastrostomy tube removal, even with tubes that are not designed for percutaneous removal. However, this case highlights the need for careful patient selection and close follow-up. It is important to ensure passage of the PEG remnant in all patients unable to confirm this visually, given the potential for complications. We recommend careful patient counseling regarding visualization of the PEG remnant. In those unable to confirm passage by day 7, AXR needs to be performed. If the remnant is seen at the initial x-ray, then follow-up x-rays are recommended. If progression of the remnant fails to occur, consideration must be given to further intervention to remove the remnant. This is particularly important in patients with a history of abdominal surgery, irrespective of imaging results prior to the procedure.

**References**