

## New detachable occlusion balloon unit for transrectal natural orifice transluminal endoscopic surgery

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<https://doi.org/10.15017/26343>

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出版情報：九州大学, 2012, 博士（医学）, 課程博士  
バージョン：  
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## Abstract

**Introduction:** Transrectal natural orifice transluminal endoscopic surgery (NOTES) requires a good endoluminal view and adequate intrarectal bacterial clearance in the working area. We developed a new occlusion balloon unit with an easily detachable inflation device, which allows the surgeon a clear working area distal to the balloon.

**Materials and methods:** The effectiveness of the sealing balloon and the extent of macroscopic and histopathological injury to the bowel wall at the site of balloon placement were examined in 12 pigs.

**Results:** The mean time to place and inflate the balloon unit was  $12.0 \pm 3.5$  min, Effective air-tightness lasted for  $21.0 \pm 12.0$  min. There was no leakage of dye (methylene blue) past the balloon when pressure was maintained above  $6.70 \pm 0.08$  kPa (6.62–6.78 kPa). After gut irrigation, good visibility was maintained in the working area for 6 hours, and adequate bacterial clearance was maintained for 3 hours. There were no macroscopic signs of intestinal wall damage at the site of balloon placement. Histopathological examination showed only patchy mucosal damage and submucosal thrombus at the site of balloon placement.

**Conclusion:** This newly-developed occlusion balloon unit helps to establish good visibility and adequate bacterial clearance for endoluminal surgical procedures.