Endoscopic Thyroidectomy With Miniature Tools in a Pig Model

Moshe Hain¹, Doron Halperin¹, David Kushnir², Yoav Mintz²

¹ Otolaryngology and Head and Neck Surgery, Kaplan Medical Center, Israel
² Center for Innovative Surgery, Hadassah Hebrew University Medical Center, Israel

OBJECTIVE

To assess the feasibility of direct endoscopic thyroidectomy in a porcine model using CO2 pneumo-dissection, miniature cameras and endoscopic tools.

METHODS

Endoscopic thyroid dissection was performed in a porcine model with CO2 pneumo-dissection, using cameras and endoscopic tools ranging in diameter between 2-5 mm (Fig 1,2). The vision was acquired using a 5mm 30 degree laparoscope and an image 1 HD camera (Stryker Endoscopy, Germany). Dissection was carried out using MiniLap tools (Stryker, California, USA) and a 2.3 mm grasper (Stryker Endoscopy, Germany). The dissected gland was extracted through the floor of mouth.

RESULTS

Thyroid dissection was performed in a total of 10 pigs. Two were “open” procedures to learn the porcine anatomy. Eight were endoscopic procedures, of them five used three, 5 mm incisions and three used three 2-3 mm incisions for surgical tools and a 5 mm incision for the endoscopic camera. In all cases the thyroid was completely dissected with the recurrent laryngeal nerve (RLN) identified and preserved (Fig 2). In 5 cases the thyroid was removed through the floor of mouth. There was no major bleeding in the live pigs and all the vital structures were identified and preserved. (Table 1)

DISCUSSION

• The advantage of endoscopic neck surgery is mainly cosmetic although the superior magnification and high resolution may also be advantages.
• A large proportion of thyroidectomy patients are young women therefore the cosmetic factor should not to be belittled
• As surgeons our primary goal is the medical well being of our patients but we should strive to improve the cosmetic outcome of our treatment as long as we are not compromising the primary goal
• Our approach combines a direct cervical approach with transoral removal to provide a truly minimal invasive procedure.
• We have shown optimal surgical exposure with the direct approach with minimal scars in the neck combined with relatively minor dissection through the floor of mouth to the neck to retrieve the thyroid. Using the direct approach we avoid extensive dissection needed in the trans-axillary approach.
• The advantages of endoscopic surgery must be weighed against the potential added risks.
• The choice of surgical approach should be tailored to the individual patient with the medical needs and personal preferences taken into account.

CONCLUSIONS

• Direct endoscopic thyroidectomy using miniature camera and tools in a porcine model seems to be feasible without major complications.
• The advantages of this approach include minimal scars and improved visualization.
• We believe that there is room for further development of minimal invasive techniques for thyroid surgery.

REFERENCES