

Minimally Invasive Neck Surgery: an animal model study

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BACKGROUND:

Minimally Invasive Neck Surgery (MINS), is already established in adult population. However, in children, its use is still new and controversial. The natural obstacles to this approach are the absence of a natural cavity, with the inherent complications of creating one artificially, and the limited workspace especially in paediatric patients.

Due to the constraints on training in minimal invasive surgery, more and more education of paediatric surgeons is taking place outside the operating room. We reproduced a vestibular approach in a rabbit model to evaluate the procedure in terms of feasibility and to report on the pitfalls of this minimally invasive procedure.

METHODS:

Transoral endoscopic thyroidectomies using a vestibular approach were performed in ten anesthetized rabbits (*Oryctolagus cuniculus*). All surgeries were video recorded. The surgical time, anatomy identified, difficulties and intraoperative complications were documented.



Fig. 1. | Surgical instruments

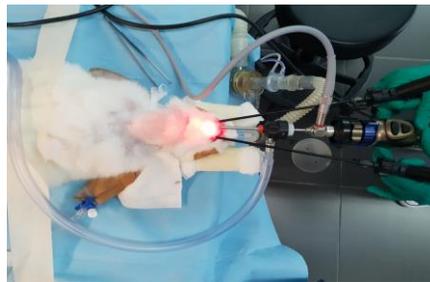


Fig. 2. | Surgical positioning



Fig. 3. | Resected Thyroid (rabbit number 10)

RESULTS:

Table 1. Results of Vestibular Thyroidectomy in Rabbit model

| | Operative time (minutes) | Complete resection | Intraoperative complications |
|----|--------------------------|--------------------|------------------------------|
| 1 | NA | Yes | None |
| 2 | NA | Yes | Trachea laceration |
| 3 | 81 | Yes (one piece) | None |
| 4 | 60 | Yes (two pieces) | Trachea laceration |
| 5 | 52 | Yes (one piece) | None |
| 6 | 45 | Yes (one piece) | None |
| 7 | 53 | Yes (one piece) | Haemorrhage |
| 8 | 30 | Yes (one piece) | None |
| 9 | 51 | Yes (two pieces) | None |
| 10 | 34 | Yes (one piece) | None |

DISCUSSION | CONCLUSION:

Simulation-based education plays a crucial role in the development of an expert surgeon. key-core surgical skills provided by simulation-based training have been shown to have an impact on learning curves. Despite the anatomical differences, the small working space in rabbits is appropriate for training. This model is still experimental and more studies with follow-up examination are necessary to reinforce the safety of oral vestibular approach in the paediatric population. As far as we know, this is the first report of an animal study using a rabbit to report the feasibility of a transvestibular thyroidectomy. This animal model seems to be a suitable model for delicate gestures training, the cornerstone of Paediatric Minimally Invasive Cervical Surgery.