



## Experience of thyroid surgery in children with intraoperative neuromonitoring

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### Aim:

To evaluate the effectiveness of intraoperative neuromonitoring of the recurrent laryngeal nerves during thyroid surgery in children.

### Tasks:

- Compare larynx video fibroscopy data before surgery, immediate and long-term postoperative period
- To develop optimal parameters of electrical stimulation for children
- Optimize surgical tactics and technique depending on the results of the study

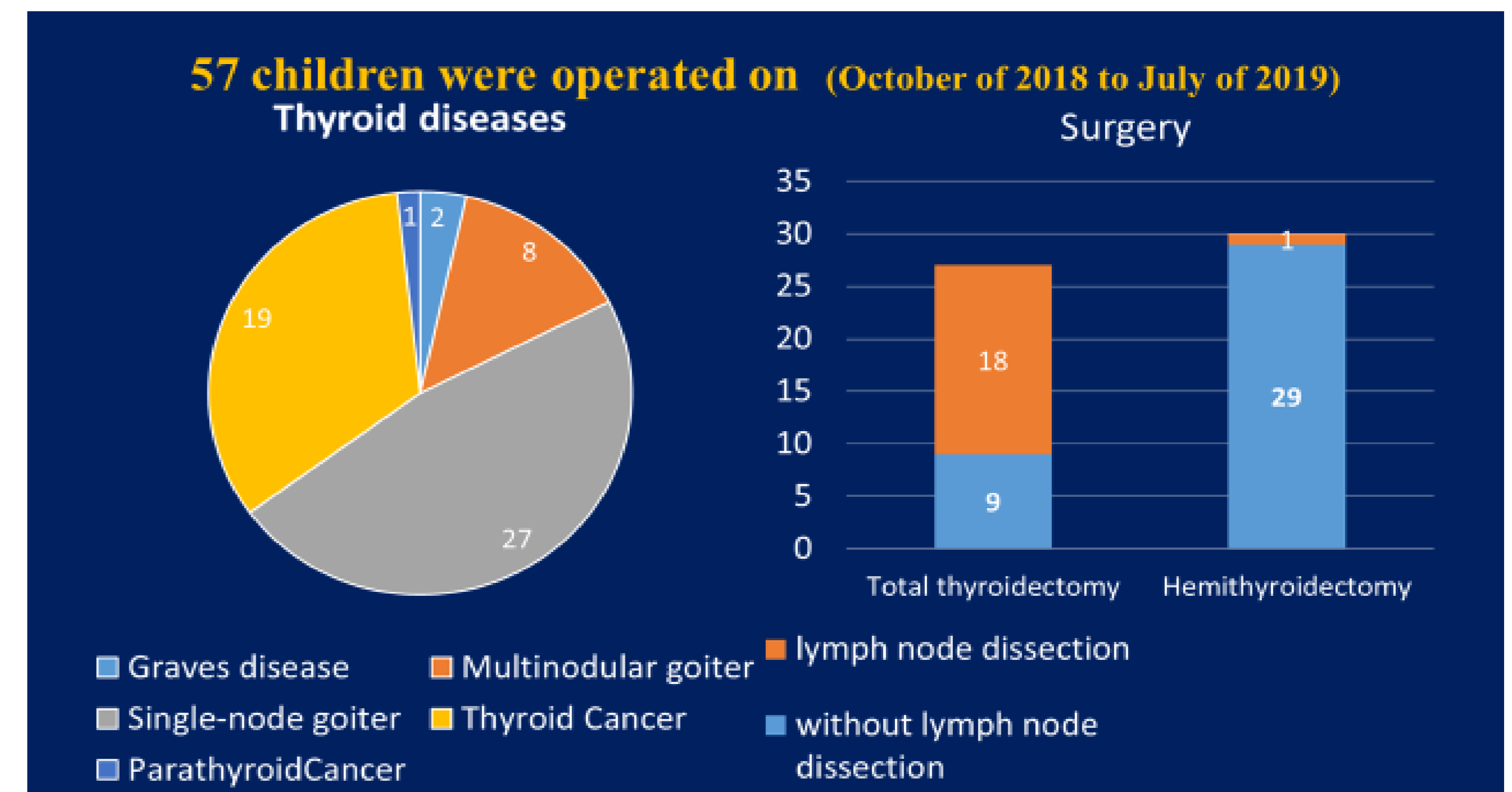
It's known that thyroid surgery to be associated with a high risk of complications. The main of them is paresis of the vocal folds due to a disturbance of the nerve impulse along the return laryngeal nerve. So many surgeons consider an operation on thyroid gland an operation on the recurrent laryngeal nerve. Surgery technique has been improved since the end of 19th century. Currently, extensive experience with use of neuromonitoring has been accumulate in adults

Нами проанализированы данные тонкоигольной аспирационной биопсии (ТАБ), срочного и The aim of our study was to evaluate effectiveness of intraoperative neuromonitoring of the recurrent laryngeal nerves in operations on the thyroid gland in children. Below the tasks that needed to be perform.

### System of neuromonitoring



The principle of the method is to install electrode on the endotracheal tube and vocal folds and apply an electrical impulse to the recurrent laryngeal nerve and nervus vagus using probes during the operation. In the case of a normal state of the nerve, the signal passes and is displayed visually on the screen and in form of audio signal. If the nerve injury occurs, even insensible visually, this will be displayed on the monitor.



The study included 57 children aged 7 to 17 years who underwent thyroid surgery using neuromonitoring and obligatory pre and postoperative phoniatic monitoring and video endoscopy of the larynx. Most children are operated on for nodular goiter and thyroid cancer. There was hemithyroidectomy and total thyroidectomy performed. Surgery was supplemented lymph node dissection in 18 children.

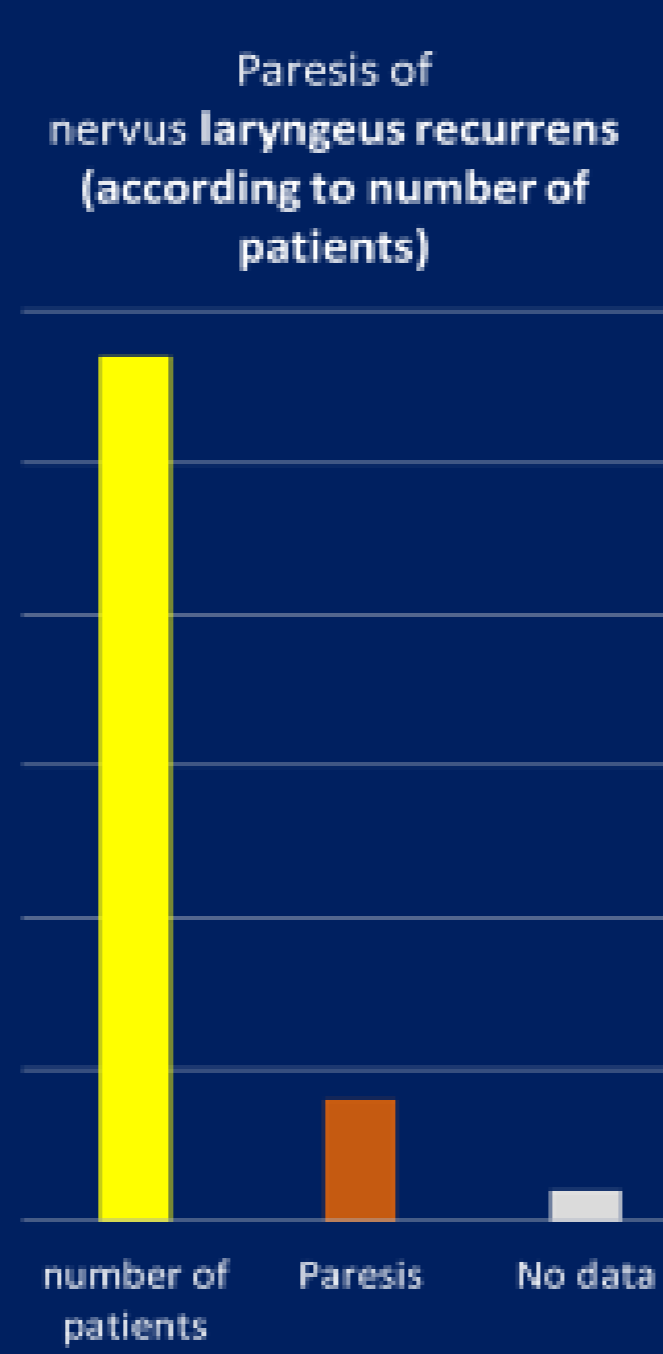
### Results

- Vocal cord paresis recorded by neuromonitoring during surgery in 10 cases out of 57 patients— 17.5%,
- confirmed by fibrolaryngoscopy in the immediate postoperative period with video fixation in all cases
  - Ipsilateral 9
  - Contralateral 1

Full recovery in 8 patients (80%) examined after 1-3-6 months was recorded by videofibrolaryngoscopy with functional tests.

Two patients did not examine due to their distance of residence;

Permanent paresis is possible in 3% (not confirmed by objective examination)



We obtained unexpected results during the study. This is a significant number of unilateral vocal folds paresis, without clinical manifestation due to compensation of the opposite side ligament movements. Only phoniatic examination and fibrolaryngoscopy allowed confirm them in few days after operation. In all cases, neuromonitor recorded a decreasing of electrical impulse along the return laryngeal nerve and vagus already during the operation. But further examination was more optimistic. We can say that in all cases, there was recovery of the vocal folds movements. Less than 3% of the paresis can persist, which is not confirmed by an objective study, because 2 of our patients did not appear for a control examination.

### Conclusion

Data of intraoperative neuromonitoring are confirmed by videofibrolaryngoscopy

#### Surgical technique

- Decrease parameters of electrical stimulation in children to 0.5-1.0 mA during mapping
- Obligatory control stimulation n. Vagus
- Limited use of aggressive hemostasis

#### Surgical tactic

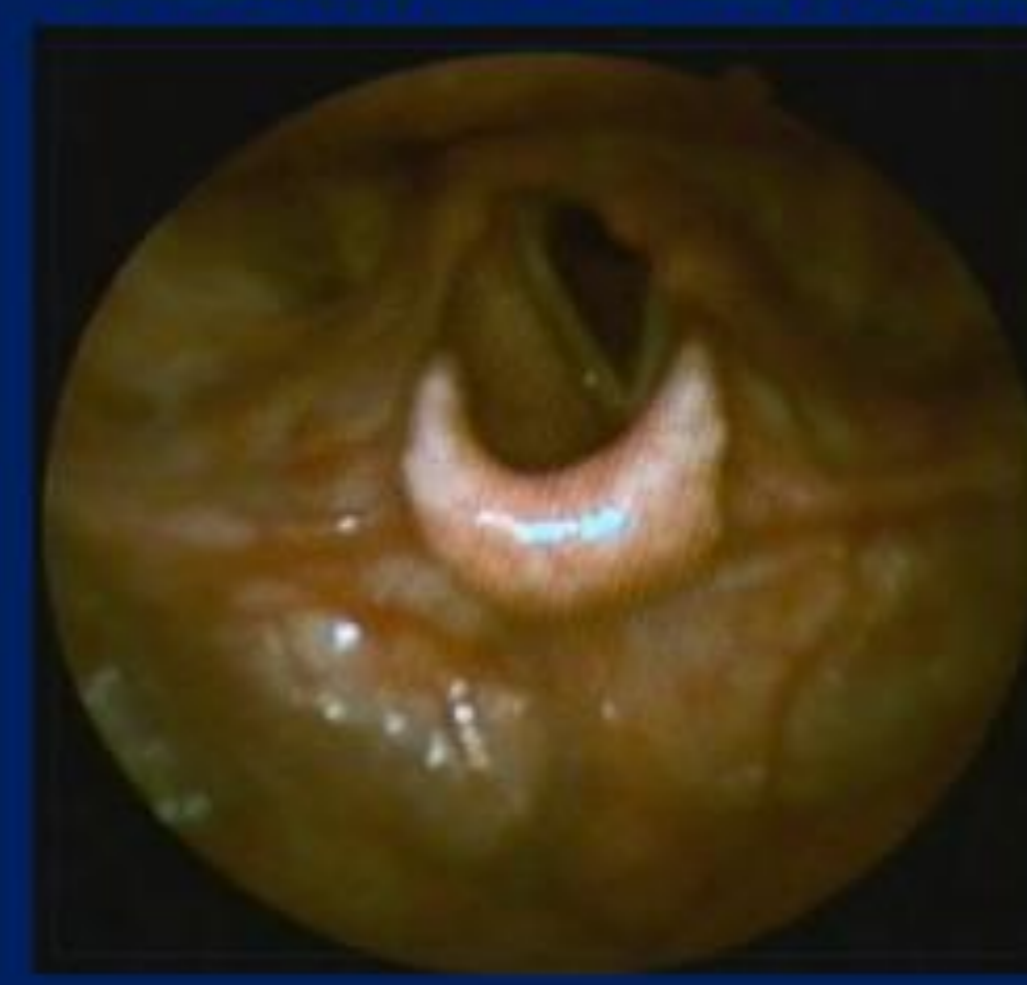
- Refusal to total thyroidectomy in case of recurrent laryngeal nerve damage on the side of disease, phoniatic rehabilitation, choice of an alternative treatment (radioiodine) or final thyroidectomy after neurophoniatic treatment

In conclusion, we propose in pediatric practice to refuse total thyroidectomy in case with absence of conduction along the return laryngeal nerve after one lobe removal and finish the treatment, that is to say remove the thyroid gland after eliminating paresis or choose another method, for example, radioiodine therapy in case of Graves' disease.

### Videofibrolaryngoscopy

Papillary cancer (microfocus). Left hemithyroidectomy

Post surgery left vocal cord paresis



Normal vocal cord function after 6 month neurophoniatic treatment



Look at the picture. This is a clinical example of transient vocal fold paresis. In this case, left fold is less movable. However, the closure occurs due to the movement of the right fold and therefore the voice is saved. Further, a complete recovery of movements after phoniatic treatment.



At the end of my presentation, I would like to say. Having visited Vienna, the capital of the opera, we especially feel the severity of the problem that you have to solve. We hope improving technology will help us with this.