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SPECIAL ASPECTS OF SURGICAL INTERVENTION IN PATIENTS WITH NODULAR GOITER COMBINED WITH AUTOIMMUNE THYROIDITIS

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Surgical intervention in patients with nodular goiter combined with autoimmune thyroiditis (AIT) is characterized by certain difficulties determined by the development of autoimmune processes in the thyroid tissue resulting from autoimmune aggression, as well as by presence of nodular formations in the thyroid gland (TG) [1, pp.116-124]. As a result of autoimmune processes the autoimmune inflammation develops both in the thyroid tissue and in the surrounding anatomical structures. Reduction of ligaments between the trachea and the TG occurs, resulting in thyroid tissue is pulled to the side walls of the trachea and tracheoesophageal grooves, and the fragility of vessels in shrunken ligaments and fasciae is observed. It contributes to the development of topographic changes of the anatomical relationship between the TG and surrounding tissues and organs [2, p. 109; 3, p. 17].

All of the above listed is of practical value for surgery in these patients, since ignoring the specifics of the natural history results in a variety of complications during and after the surgery. There is a high risk of damage to the recurrent laryngeal nerves and parathyroid glands, complications associated with tracheomalacia, which is a consequence of prolonged compression of the tracheal rings replaced by thyroid tissue of the TG, as its density varies from tightly-elastic to ligneous, as well as bleeding [4, p. 26; 5, p. 142].

Therefore, considering the above characteristics of this pathology we have improved the technique of surgical intervention, taking into account all the features inherent to the patients with nodular goiter combined with AIT. The surgeries were performed in the following way: the section line passed on the front surface of the neck 1-1,5 cm above the jugular notch using collar incision (the Kocher’s approach). The clamped 2nd cervical fascia was transected transversely along with the external jugular veins, with hemostasis achieved by caprone suturing and ligation. Subcutaneous vessels were cauterized. Musculocutaneous flap which included skin, subcutaneous adipose tissue and platysma, was dissected using a blunt technique 2-3 cm upwards. Afterwards, sternohyoid and sternothyroid muscles were dissected transversely. In case of muscle bleeding the vessels were sutured and ligated along with the muscle tissue. Parietal layer of the 4th fascia of the neck was dissected

longitudinally after prior hydropreparation. It was dissection, rather than separation, of the above-specified muscles together with the parietal layer of the 4th fascia, that allowed us to perform thorough visual examination and palpation of TG in these patients. This method has a significant diagnostic value, since the intraoperative assessment of the thyroid tissue allowed us to specify the nature and extension of the pathological process in the TG, the presence and nature of mass formations in it, as well as to choose an adequate amount of surgical intervention in each individual patient with complex pathology. All this is possible only with the sufficient approach to the TG. After visual examination and palpation of the thyroid tissue the next step was taken: mobilization of the isthmus of the TG which started from its lower edge by transection of the fascial band that included azygos veins and arteries. The latter were sutured and ligated. The mobilization of the upper edge of the isthmus was carried out by transection of the median thyrohyoid ligament, which is formed by thickened parietal layer of the 4th fascia. Between the trachea and the isthmus from the bottom to the top a soft clamp was passed through, moving apart its branches with separating the rear surface of the thyroid isthmus from the front surface of the trachea. Afterwards, another soft clamp was applied and the isthmus was transected at its midline, after which the front surface of the entire cervical part of the trachea was released. This is an important stage of the surgery on the TG, since it allows us to reduce compression of the trachea, which is enlarged and modified due to autoimmune process of the TG, with further facilitation of the next stage of the surgery, that is the mobilization of one of the thyroid lobes. Either the right or the left lobe was fixed on a thread while performing its lateral and inferior traction. Mobilization of the upper pole of the lobe began with transection of the superior suspensory ligament, which is a connective tissue plate, that consists of two layers, which fixates the upper inner edge of thyroid lobe upper pole up to the thyroid cartilage along the attachment line of sternothyroid muscle. The transection of this ligament was performed in the non-vascular area by introducing a soft clamp into the fascìal area between the trachea, the cricoid cartilage and the lateral surface of the thyroid cartilage, with the superior laryngeal nerve lying medially, the upper pole of the lobe and the superior thyroid artery and its branches lying laterally, with further diverging of the clamp branches and separation of the upper pole of the TG from the trachea, the cricoid cartilage and the lateral surface of the thyroid cartilage, as well as the superior laryngeal nerve. As a result of the transection of the superior suspensory ligament the anterior branch of the superior thyroid artery was transected. After dissection of the superior suspensory ligament the posterior fascial leaf was transected, which resulted in mobilization of the rear edge of the upper pole of the lobe, that was fixated up to the muscles of the larynx and pharynx, as well as the rear branch of the superior thyroid artery, which is a part of the rear facsial leaf.

The next stage of the surgery was mobilization of the lower pole of the thyroid lobe. Herewith, we applied soft clamps on fascial leaf, which included the inferior thyroid artery, along the edge of the lower pole of the thyroid lobe as close as possible to the thyroid tissue and dissected the soft structures. Afterwards, the thyroid lobe became more mobile, which allowed to divert it medially in order to be able to examine the posteromedial surface of the lobe. After that we applied the clamps on the ligament passing along the lower edge of the cricoid cartilage and connecting the rear surface of the thyroid lobe with the lower edge of cricoid cartilage, and in its rear parts - with the edge of the cricopharyngeal portion of the inferior pharyngeal constrictor muscle, which contains longitudinal and transverse vessels of superior and inferior thyroid artery.

At one of the final stages of mobilization of the lobe away from the surrounding tissues we applied the clamps on the Berry's ligament (posterior suspensory ligament), which projects on the lateral surface of the trachea and passes through in the oblique-longitudinal direction up to 2-3 upper trachel rings. This ligament contains a branch of the inferior thyroid artery. For better visualization and access to the ligament the lobe was diverted laterally as much as possible with traction downwards and upwards with turning along the axis from the trachea outwards. After complete dissection of the ligament the lobe was dislocated from fascial bed, to which it remained connected only with fascial leaf along the posterolateral surface. The latter was clamped and the lobe was resected. In case of resection of the TG, we changed only the final stage of lobe mobilizing. The procedure was as follows: when the lobe was fixed to the vascular fascial leaf along the posterolateral surface, we removed a portion of the lobe so that the required amount of unmodified thyroid tissue remained on the clamps, assuming that 1 cm^3 of the tissue weighs about 1 gram.

At every stage the thyroid lobe was held and compressed with the left hand fingeres. This way we could avoid bleeding from the thyroid tissue and the surgical field remained dry. This is a very important point of successful surgery, since it is one of the preventive measures for the damage to the superior and inferior recurrent laryngeal nerves, parathyroid glands, bleeding during surgery. The vessels, which were clamped during separation of the lobe, were closed with loop sutures, while the needle was passed through precisely under the lower edge of the clamp branches, distally from the clamp, making the loop around the blood vessel or the proximal portion of the fascial leaf compressed with the soft clamp, and ligated. This technique of ligation allows us to prevent slippage of the ligature applied on the vessel. The trachea was closed with two caprone sutures applied on the midline of the parietal layers of the 4th fascia. Drainage tubes were placed through the area between the sutures and up to the bottom of the wound. The integrity of the

sternohyoid and sternothyroid muscles was repaired with the interrupted sutures. Individual interrupted sutures were used to close the 2nd fascia of the neck and platysma up the to the drainage. The integrity of the skin was repaired with interrupted sutures or running intracutaneous suture. The sutures around the drainage were placed to preserve perfect matching of the skin edges of the wound after their removal. The drainage tubes were removed 24 hours later, the stitches were taken out 48 hours after the surgery, since the sutures on the platysma are providing the fixation.

Overall, we have operated on 137 patients with nodular goiter in combination with AIT using the above described technique of surgical intervention. This allowed us to reduce the number of complications caused by the surgery, which are damage to the recurrent laryngeal nerves, parathyroid glands, and bleeding.

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