

Defining and Limiting Minimal Invasive Thyroid Surgery

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Abstract

This overview has been prepared to assist members of the Greek Society of Endocrine Surgeons (GSES) in making definitions and recommendations concerning minimally invasive techniques employed in thyroid surgery. It is based on a review of the medical literature and specialist opinion. It should not be regarded as a definitive assessment of the procedure. The international literature was reviewed and 467 relevant articles concerning minimal invasive thyroid surgery were retrieved. All studies were carefully analyzed in order to help members of GSES to globally recognize the subject, define it and issue guidelines. In a tentative to define minimal invasive thyroidectomy (MIT), we could say that it is any thyroidectomy performed via a small incision or through holes aiming to minimize tissue damage, which means less pain, less traumatic surface with acceptable complication rate. By definition, MITs include minimal invasive video-assisted thyroidectomies (MIVAT), loupes-assisted thyroidectomies (LATE) and transoral thyroidectomies (TOT). In order to sustain a safe and high quality surgical practice, the indications and limitations of MIVAT/LATE are to be considered. Most authors agree that reoperation and previous irradiation of the neck are factors rendering MIVAT/LATE impossible to perform. With regard to the size of the predominant nodule, everybody seems to concur that nodules less than 3cm are eligible for MIVAT/LATE, whereas in terms of the total volume of the excised gland, most authors would agree that any gland with a volume less than 20ml is eligible. Finally, during the last decade MIVAT/LATE have become accepted techniques for treating thyroid cancer. Where experienced surgeons are involved, MIVAT/LATE can be performed for tumours up to T4aN1a. However, most authors seem to suggest to less experienced surgeons that oncologic thyroidectomies be performed up to T1N0.

Key words: *Thyroidectomy; minimal invasive surgery; loupes assisted thyroidectomy; robotic thyroidectomy; endoscopic thyroidectomy; minimal invasive thyroidectomy*

Introduction

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Method

Surgery of the thyroid gland may involve removal of the whole thyroid gland (total thyroidectomy) or part of the gland (subtotal thyroidectomy, hemithyroidectomy or lobectomy). Conventional thyroid surgery is performed

without the use of any special instrumentation. Under general anaesthesia, a 6cm incision is made in the front of the neck (Kocher incision). The underlying muscles are opened to expose the thyroid gland, some or all of which is removed. Care is taken to avoid injury of nearby structures (especially the recurrent laryngeal nerves and the parathyroids), usually by visual identification alone [1]. In recent years, special focus has centred on minimally invasive surgery especially on the thyroid gland. Various techniques have been described, only few of which have been accepted widely.

Results

In the literature, we were able to retrieve 467 relevant articles concerning minimal invasive thyroid surgery. Among these articles, we identified 27 trials, 75 reviews, 25 systematic reviews, 70 comparative studies, and 3 meta-analyses. All studies were carefully analyzed to help the members of GSES to globally recognize the subject, define it and issue guidelines.

The definition of minimal invasive thyroidectomy does not officially exist. On the other hand, we have the definition of minimally invasive surgery, which is: "Any operation

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performed via a small incision or through holes aiming to minimize tissue damage, which means less pain, less traumatic surface with acceptable complication rate". With respect to and in analogy with prior definition, minimal invasive thyroidectomy could be defined as: "Any thyroidectomy performed via a small incision or through holes aiming to minimize tissue damage, which means less pain, less traumatic surface with acceptable complication rate."

Conventionally, thyroid surgery is performed without the use of any technology through a 6cm low cervical incision (Kocher incision) made directly over the gland. A minimal thyroidectomy requires a smaller incision and/or holes without increasing the traumatic surface. By this definition, minimal invasive video-assisted thyroidectomies (MIVAT), the loupes-assisted thyroidectomies (LATE) and the transoral thyroidectomies (TOT) are considered minimal invasive thyroidectomies. However, since TOTs are in the experimental stage, we will not enter into detail.

When searching PubMed using the term minimally invasive thyroidectomy, we observed that authors tend to consider four categories of operations as minimal invasive thyroidectomies: (i) robotic (16/467 articles), (ii) TOT (7/467 articles), (iii) endoscopic (53/467 articles) and (iv) MIVAT/LATE (391/467 articles). When combining the publication date with the previously mentioned definition, we can clearly confirm that even surgeons actually consider MIVAT/LATE as minimally invasive procedures.

Discussion

Under this perspective, it is of major importance to every endocrine surgeon to acknowledge the indications and limitations of MIVAT/LATE in order to sustain a safe and high quality surgical practice. As a basis for our recommendations, we used the meta-analysis of Liu et al [2], as well as the available clinical trials not included in this meta-analysis. We chose this specific article of Liu et al because it included the meta-analyses conducted by Sgourakis et al [3] and Radford et al [4].

Most authors agree that reoperation, previous irradiation of the neck and thyroiditis are factors rendering MIVAT/LATE impossible to perform. However, both Miccoli et al [5] and Papavramidis et al [6] have recently removed thyroiditis from the contraindications.

There is much discussion, both in literature and in real life, concerning the size of the thyroids removed with MIVAT/LATE. The aspect size encompasses two parameters: (i) the size of the predominant nodule and (ii) the total volume of the gland. With regard to the first parameter, everybody seems to agree that nodules less than 3cm are eligible for MIVAT/LATE. However, at least three authors

claim in their trials that tumours > 4cm are also eligible [6-8]. Concerning the total volume of the excised gland, most authors would agree that any gland with a volume less than 20ml is eligible for MIVAT/LATE. However, several authors, including Miccoli himself, also consider greater volumes (up to 50ml) as eligible [6, 9-13].

Finally, during the last decade, MIVAT/LATE have become accepted techniques for treating thyroid cancer. The main issue that remains under question is to what extent we can perform a correct oncological operation. At this point, we have to acknowledge the surgeon's experience in minimal invasive thyroidectomies. Where experienced surgeons are involved, MIVAT/LATE can be performed for tumours up to T4aN1a. This means that tumours with extrathyroidal extension and positive lymph nodes to the central compartment can be included. However, most authors seem to suggest to less experienced surgeons that oncologic thyroidectomies be performed up to T1N0.

Conclusions

In a tentative to define minimal invasive thyroidectomy (MIT), we could say that any thyroidectomy performed via a small incision or through holes aims to minimize tissue damage, which means less pain, less traumatic surface with acceptable complication rate. By definition, MITs include minimal invasive video-assisted thyroidectomies (MIVAT), loupes-assisted thyroidectomies (LATE) and transoral thyroidectomies (TOT).

In order to sustain a safe and high quality surgical practice, the indications and limitations of MIVAT/LATE are to be considered. Most authors agree that reoperation and previous irradiation of the neck are factors rendering MIVAT/LATE impossible to perform. With regard to the size of the predominant nodule, everybody seems to concur that nodules less than 3cm are eligible for MIVAT/LATE, whereas in terms of the total volume of the excised gland, most authors would agree that any gland with a volume less than 20ml is eligible.

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