Summary

Thyroid surgery has evolved considerably from the times of Billroth and Kocher due to better understanding of the surgical principles, better equipment and advanced surgical techniques. Kocher, in 1909, pioneered what is today known as the conventional thyroidectomy. It has remained the standard approach to the thyroid gland and is still the most widely used technique world-wide. A recent advance is minimal access thyroid surgery (MITS). Though the concept of minimal access surgery is not new and it has been practiced in many other surgical specialties for over two decades now, its acceptance in head and neck surgery remained rather slow. Since Gagner *et al*. reported an endoscopic approach to the parathyroid glands, various techniques have been described and popularised for thyroid surgery as well. Shifting focus of thyroid surgery towards less invasive techniques for better aesthetic outcomes has resulted in the emergence of minimally invasive approaches for the thyroid gland/compartment. The concept of MITS is attractive because patients are concerned not only about the results of treating their thyroid disease, but also outcomes such as better cosmesis, reduced hospital stay and decreased pain.

MITS has expanded in the last decade and is being considered as an alternative to conventional thyroidectomy simply because it reduces tissue trauma and

postoperative pain, and provides excellent cosmetic results. Many different techniques have been developed for MITS over a short period; these can be broadly classified into pure endoscopic techniques, video-assisted techniques and minimally invasive open surgery. In pure endoscopic techniques, the thyroid compartment is approached using different routes with the help of endoscopes with or without carbon dioxide gas insufflation. The lateral neck, axillary, anterior chest and breast approaches have all been described. All these approaches have in common the use of a 50° endoscope. They differ only by the site of placement of the access cannulas. This technique avoids a visible neck scar, provides excellent cosmetic results and allows early return to work.

Minimally invasive video-assisted thyroidectomy (MIVAT) is the most widely used MITS technique. MIVAT was first introduced and popularised by Miccoli *et al*. in Italy in the late 1990s. It has been extensively used in other parts of the world and appears to be an excellent minimally invasive approach to the thyroid. A small incision (1.5 cm) is made in the cervical skin crease and the operation is completed using a video-endoscope, except for the final delivery of the gland, which is removed through the original neck incision. Another less commonly used modification of MIVAT technique is the video-assisted neck surgery where an anterior neck flap is lifted without using gas insufflation and a tent-like working space is created. Minimally invasive open surgery techniques are also known as

‘small incision thyroidectomy’ and do not require specialised instruments like endoscopes and video assistance. Broadly speaking these techniques are similar to conventional thyroidectomy but differ only in the length of the incision.

Major advantages of MITS techniques include reduced tissue trauma, shorter hospital stay, better cosmetic results, minimal postoperative pain, reduced cost of healthcare and, above all, patient comfort. Video-assisted endoscopic techniques in addition offer a magnified, illuminated view of the operating field. Miccoli *et al*., who have reported the largest series of MIVAT, noted reduced postoperative pain, better cosmetic results and short hospitalisation stay. In another prospective study, the authors reported significant reduction in postoperative pain and better cosmetic results in the MIVAT group as compared to the conventional surgery group.

The main disadvantages of MITS procedures are the longer duration of surgery, steep learning curve and increased cost of surgery due to equipment usage. The reported rate of important complications (like recurrent laryngeal nerve palsy and hypoparathyroidism) are similar to those seen in after conventional thyroid surgery. Miccoli *et al*. reported rates of recurrent nerve palsy and hypoparathyroidism of 1.3% and 0.3%, respectively, in their report of MIVAT.

There is an expanding role of MITS techniques for thyroid malignancies especially papillary thyroid carcinoma (PTC). Malignancies of the thyroid were not

considered suitable for an endoscopic approach until 2002, when Miccoli *et al*. reported a series of endoscopic surgery for PTC. The authors found no significant statistical difference between MIVAT and conventional thyroidectomy in these patients, both in terms of iodine (^{131}I) uptake and circulating thyroglobulin (Tg) levels. It appears that MITS can be an effective alternative to conventional thyroidectomy for selected patients with well differentiated thyroid cancers, especially PTC.

Judicious patient selection is the most important cornerstone for the success of any MITS technique for both benign and malignant thyroid swellings. At present, there are no specific criteria laid down for deciding suitability of a particular candidate for MITS; however, there appears to be a consensus on the size of tumour (< 35 mm for benign and < 20 mm for malignant thyroid nodule/gland). Other commonly agreed indications for MITS are that there should be no previous irradiation or surgery. Low-risk papillary carcinoma without any sub-sternal extension and extrathyroidal spread is the only malignant thyroid disease suitable at the moment.

As technology continues to develop and impact on surgical techniques, it is likely that these minimally invasive approaches will become more widely used and easier to perform. As of now, MITS appears to be a useful addition to conventional thyroid surgery. We need more long-term follow-up and comparative trials to validate these interesting techniques. There is a need to look into the expanding

indications as well as the completeness of MITS procedures, especially in cases with malignant thyroid disease.