

Advice Statement 002/18

January 2018

Is transoral robotic surgery (TORS) clinically and cost-effective for the treatment of oropharyngeal and supraglottic laryngeal cancers?



Why is SHTG looking at this topic?

Da Vinci robotic surgical devices are a relatively new technology which is available at three centres in NHSScotland. These devices are currently used predominantly to provide a laparoscopic prostatectomy service. To ensure the devices are optimally employed, NHSScotland is considering expanding the indications for which robotic surgery is available. This work was requested by the West of Scotland Cancer Network and accepted onto the SHTG programme as a priority to support evidence-informed use of robotic surgery capacity.

Evidence Note 74 was produced by Healthcare Improvement Scotland in response to this request.

SHTG advises that:

Evidence from qualitative studies on head and neck cancer patient experiences of (chemo)radiotherapy and open surgery suggests that these treatments can have a considerable impact on the physical and psychosocial functioning of patients.

Studies comparing transoral robotic surgery (TORS) with (chemo)radiotherapy or conventional surgery for the treatment of oropharyngeal cancer were all non-randomised observational studies.

Oropharyngeal cancer: TORS versus (chemo)radiotherapy

There were no statistically significant differences in survival in comparisons of TORS with (chemo)radiotherapy in patients with primary oropharyngeal cancer. Swallowing function was statistically significantly better in the TORS group.

Evidence on whether TORS is cost-effective in patients with oropharyngeal cancer was inconclusive. The findings tended to indicate that TORS was not cost effective, yet the studies were based on a non-UK setting which limits the generalisability of the results.

Oropharyngeal cancer: TORS versus conventional surgery

Findings from studies comparing TORS with conventional surgery (open or transoral) in patients with oropharyngeal cancer were inconclusive.

A proportion of patients undergoing open surgery experience long-term speech impairment, disfigurement or pain. TORS may therefore be an appropriate treatment to consider in patients with recurrent oropharyngeal cancer where conventional open surgery may be the only alternative treatment.

Supraglottic laryngeal cancer: TORS versus radiotherapy

Evidence on TORS in supraglottic laryngeal cancer patients was limited to small non-comparative case series.

No conclusions could be reached on the clinical or cost-effectiveness of TORS in patients with supraglottic laryngeal cancer due to a lack of studies comparing TORS with radiotherapy.

NHS boards are required to consider Scottish Health Technologies Group (SHTG) advice.

Background

TORS has been suggested as a minimally invasive surgical approach to treating oropharyngeal and supraglottic laryngeal cancers. There is currently no laparoscopic alternative to major open surgery for these cancers, therefore many patients are treated with (chemo)radiotherapy.

Clinicians estimate that 20% of patients with oropharyngeal or supraglottic laryngeal cancer would be suitable for TORS. Based on this estimate and annual incidence in Scotland, approximately 90–130 Scottish patients would be eligible for TORS each year.

Clinical effectiveness

Oropharyngeal cancer: TORS versus (chemo)radiotherapy

- Non-randomised observational studies found no statistically significant differences in overall survival (2 studies, n=194) or disease-free survival (3 studies, n=321). These studies were retrospective and at risk of bias, particularly relating to patient selection.
- Three of these studies reported statistically significant differences in aspects of quality of life (swallowing, saliva, chewing, taste, physical appearance) favouring TORS at one or more follow-up points up to 12 months post-treatment. Quality of life was assessed using a variety of scoring systems.

Oropharyngeal cancer: TORS versus conventional surgery (transoral or open) - primary cancer

- Evidence was limited to non-randomised studies which were all at risk of selection bias (3 studies, n=324).
- Findings for disease-free survival were inconclusive. There was no statistically significant difference in overall survival in the only study that measured this outcome.
- Length of hospital stay was statistically significantly shorter in the TORS group in two studies: 14.6 ± 4 days versus 24.6 ± 5.9 days, p=0.001; and 14.4 days versus 19.7 days, p=0.03.

Oropharyngeal cancer: TORS versus conventional surgery (transoral or open) - recurrent cancer

- Surgical interventions may be the only treatment option for patients with disease recurrence who previously received (chemo)radiotherapy.
- In one non-randomised study in patients with oropharyngeal cancer recurrence (n=128):
- Overall survival was statistically significantly better in the TORS group: 74% versus 43%, p=0.01.

- Mean length of hospital stay was statistically significantly shorter in the TORS group: 3.8 versus 8.0 days, $p < 0.001$.

Supraglottic laryngeal cancer: TORS versus radiotherapy

- Evidence was limited to small single-arm case series (6 studies, $n=76$). No studies comparing TORS with radiotherapy were identified.

Volume-outcome

- In two retrospective analyses of overlapping data from the US, hospitals with high volume of TORS for oropharyngeal cancer were associated with statistically significantly lower positive margin rates compared with low volume hospitals: 8.2% versus 16.7%, $p=0.001$ and 15.8% versus 26.1%, $p < 0.001$.

Safety

- Four published studies reported adverse event rates in oropharyngeal cancer patients:
 - Adverse events were recorded in 30% to 65% of patients undergoing TORS (4 studies, $n=281$)
 - The adverse event rate in patients undergoing open surgery was 38% to 59% (2 studies, $n=185$).
 - No adverse events were reported for patients receiving chemoradiotherapy (2 studies, $n=96$); this may be due to studies only reporting surgery-related adverse events.
- Adverse events were reported in 12% to 23% of supraglottic laryngeal cancer patients undergoing TORS (2 studies, $n=89$). Adverse event rates for radiotherapy in patients with supraglottic laryngeal cancer were not available from the literature identified, therefore it is uncertain how the TORS adverse event rate compares with current practice.
- The most frequently reported adverse events were peri-operative bleeding or respiratory problems.

Cost effectiveness

Oropharyngeal cancer

- Conflicting evidence on TORS compared with (chemo)radiotherapy came from four US studies which may not generalise to the UK setting.
 - In two studies comparing TORS with radiotherapy alone ICERs (expressed as cost/QALY) were well above willingness-to-pay thresholds commonly accepted in the UK. In one study TORS was superior compared to chemoradiotherapy, offering increased benefits (QALYs) and lower costs, while in another study focused on a population of human papillomavirus (HPV) positive patients, chemoradiotherapy was superior to TORS.
 - Cost-effectiveness of TORS varied with the comparator, use of adjuvant therapy, post-surgical recurrence rates and type of costs used in the analysis.
- No cost-effectiveness studies were identified that compared TORS with conventional surgery.

Supraglottic laryngeal cancer

- No cost-effectiveness evidence was identified on TORS in patients with supraglottic laryngeal cancer.

Patient and social aspects

- No identified studies explored patient experiences or preferences relating to TORS. Evidence was however identified on patient experiences or preferences relating to other treatments for head and neck cancer.
- Evidence from two qualitative studies suggests that (chemo)radiotherapy and major open surgery for head and neck cancer can have a considerable impact on the physical and psychosocial functioning of patients.
- In a narrative systematic review head and neck cancer patients rated survival, cure, pain and swallowing as important outcomes.

Context/organisational issues

- Robotic systems (da Vinci®, Intuitive Surgical Inc., California) are installed in three centres in Scotland: Edinburgh, Glasgow and Aberdeen. Each robotic system is presently used 2 to 3.5 days per week to provide a robotic assisted laparoscopic prostatectomy service. The technology is also used in some centres for renal and bladder cancers and for gynaecological indications. As well as interest from head and neck surgeons, colorectal surgical teams are currently exploring robotic assisted surgeries.
- In 2012 a UK evaluation of robotic surgery detailed the costs associated with each procedure. The consumable costs per procedure were approximately £1,200. Despite being based on the prostatectomy procedure, it is expected that this cost is indicative of TORS procedure consumable costs. Additional cost data of interest include the cost of the robot, service and contract costs, and the costs of specialist equipment; full utilisation of the robots will reduce the overall average procedure cost.
- In the first two years of use to March 2017, 486 procedures have been performed: 442 prostate, 33 kidney or renal pelvis, 7 bladder and 4 relating to other cancers.
- TORS is available for selected head and neck cancer patients at twelve centres in England and Wales. The [NHS England commissioning policy](#) is to not routinely refer patients with oropharyngeal or laryngeal cancer for TORS.
- Insufficient evidence was identified to draw any conclusions about the learning curve for TORS.

Further research

Based on the [IDEAL framework](#), TORS appears to be at an early stage of evidence development for these indications. Where possible, prospective comparative studies are needed that:

- Include patients with supraglottic laryngeal cancer or oropharyngeal cancer
- Compare TORS with conventional surgery or (chemo)radiotherapy
- Focus on long-term clinical outcomes, quality of life, survival, and long-term costs.

Advice context:

No part of this advice may be used without the whole of the advice being quoted in full. This advice represents the view of the SHTG at the date noted.

It is provided to inform NHS boards in Scotland when determining the place of health technologies for local use. The content of this Advice Statement was based upon the evidence and factors available at the time of publication. An international evidence base is reviewed and thus its generalisability to NHSScotland should be considered by those using this advice to plan services. It is acknowledged that the evidence constitutes only one of the sources needed for decision making and planning in NHSScotland. Readers are asked to consider that new trials and technologies may have emerged since first publication and the evidence presented may no longer be current. SHTG Advice Statements are intended to inform a decision at a particular point in time. They will however be considered for review if requested by stakeholders, based upon the availability of new published evidence which is likely to materially change the advice given. This advice does not override the individual responsibility of health

professionals to make decisions in the exercise of their clinical judgment in the circumstances of the individual patient, in consultation with the patient and/or guardian or carer.

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Chair
Scottish Health Technologies Group



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