



HEALTH TECHNOLOGY WALES (HTW) GUIDANCE 010 (August 2019)

Robot-assisted thoracic surgery

HTW Guidance: Robot-assisted thoracic surgery shows promise for lung resection, but there is currently insufficient evidence to support routine adoption.

The current evidence indicates that robot-assisted thoracic surgery may improve some short-term outcomes compared with conventional surgical approaches but long-term benefits are uncertain. Robot-assisted thoracic surgery is more costly than other types of surgery.

Further research is needed to define the possible impact of robot-assisted surgery on long term survival and disease recurrence as well as on patient experience and post-operative recovery.

Why did Health Technology Wales issue this guidance?

Robot-assisted thoracic surgery is a form of minimally invasive surgery for people undergoing resection of lung tissue for cancer or other conditions. Current treatment involves either an open operation or a different minimally invasive approach that uses instruments guided by an invasive camera (video-assisted thoracoscopic surgery). The potential advantages of robot-assisted surgery are that it might improve surgical precision as well as offer less invasive surgery and wider removal of diseased tissues.

The HTW Appraisal Panel concluded that while the current evidence suggests that robot-assisted thoracic surgery might improve some short-term outcomes, there appears to be no convincing evidence of long-term benefits compared with conventional surgery, and robot-assisted surgery is more expensive. The HTW Appraisal Panel would like to see more evidence emerge that addresses possible longer-term outcomes as well as the impact of robot-assisted surgery on the patient experience.

This topic was notified to HTW by a Consultant Thoracic Surgeon from Cardiff and Vale University Health Board, Ms Malgorzata Kornaszewska.

The status of HTW Guidance is that NHS Wales should adopt this guidance or justify why it has not been followed. HTW will evaluate the impact of its guidance.

Summary of the evidence

HTW assessed the effectiveness of robot-assisted thoracic surgery for lung resection or anterior mediastinal mass excision and compared outcome measures with conventional treatment using video-assisted thoracoscopic surgery (VATS) or open surgery.

The evidence comprised 4 systematic reviews and 3 observational studies which supported a comparative assessment of the clinical effectiveness of robot-assisted thoracic surgery and either VATS or open surgery. All the evidence is from non-randomised trials which include data that was largely collected retrospectively. No randomised clinical trial (RCT) data was found to inform this assessment. This means the current evidence may not be reliable and needs to be interpreted with caution. A full description of the evidence can be found in the evidence appraisal report (EAR011).

The current evidence suggests that robot-assisted thoracic surgery may be beneficial compared with VATS in improving short-term mortality (30 days), but there is no evidence of improved longer-term survival or the incidence of disease recurrence. The impact of robot-assisted thoracic surgery as compared with VATS on the duration of surgery, length of hospital stay and patient experience is uncertain on the basis of the current evidence.

The current evidence suggests that robot-assisted thoracic surgery may be beneficial compared with open surgery in improving short-term mortality (up to 30 days) and reducing the length of hospital stay after surgery, but the duration of surgery may be longer with robot-assisted thoracic surgery than open surgery. There is currently no convincing evidence that robot-assisted surgery improves either longer term survival (beyond 30 days) or the incidence of subsequent disease recurrence, and its impact on patient experience and quality of life remains undefined.

HTW conducted a cost-consequences analysis that compared the costs of robot-assisted thoracic surgery with VATS or open surgery. This took into account the current evidence of possible short-term but not longer-term differences in outcomes between the treatment modalities. The findings indicate that robot-assisted thoracic surgery is likely to be more costly than either VATS or open surgery.

Appraisal Panel considerations

- The Appraisal Panel heard from the experts that thoracic surgery is most often needed for the resection of lung cancer but removal of other mediastinal masses is also sometimes required. The conventional approach to thoracic surgical resection is either with the use of video-assisted thoracoscopic resection (VATS) or alternatively with open surgery via a thoracotomy.. The experts explained that the use of VATS has increased over recent years. A minimally invasive approach to treatment is favoured by surgeons and offers patients the opportunity for enhanced recovery. It is estimated that approximately 440 people per year require major thoracic surgery (necessitating either thoracotomy or VATS) in Wales.
- The experts explained that the use of a robot-assisted approach to thoracic surgery is an alternative minimally-invasive approach to VATS that offers the possibility of high levels of surgical precision. It was explained that this is a technically demanding procedure that requires appropriate proctorship and training, even in the hands of experienced thoracic surgeons, with a learning curve of at least 20 cases. The Appraisal Panel learnt that robot-assisted thoracic surgery is not currently practised in Wales. The Appraisal Panel noted that while there is a relatively large amount of evidence on which to base a comparison of robot-assisted thoracic surgery with VATS or open surgery, the trials are all non-randomised and therefore may be susceptible to high levels of bias. The Panel concluded that while robot-assisted thoracic

surgery may reduce 30 day mortality after thoracic surgery when compared with VATS and open surgery, there is no convincing evidence of improved longer term survival or reduced disease recurrence. The Appraisal Panel also considered that there was insufficient evidence to conclude that robot-assisted thoracic surgery leads to a reduction in other post-operative complications as compared with conventional surgical approaches.

- The experts explained that robot-assisted thoracic surgery takes longer to do than open surgery and the Appraisal Panel noted that this was borne out by the results of the studies. They concluded, however, that the relative duration of robot-assisted thoracic surgery compared with VATS is inconclusive and the experts pointed out that, in experienced hands, 3 cases of robot-assisted thoracic surgical resections can be done in a full operating day. The Appraisal Panel noted that the evidence suggests a reduced length of hospital stay with robot-assisted thoracic surgery as compared with open surgery but not as compared with VATS.
- The experts explained that the use of minimally-invasive approaches to thoracic surgery offers potential advantages to patients through reduced peri-operative pain and discomfort and enhanced recovery in hospital and in the community. The Appraisal Panel noted, however, that there is no convincing published evidence that demonstrates that robot-assisted thoracic surgery offers improvements in patient-reported outcome measures as compared with conventional surgical approaches but would welcome such outcomes to be included in future clinical trials.
- The Appraisal Panel noted that the economic analysis showed that robot-assisted thoracic surgery was more costly than both VATS and open surgery and that there is currently no convincing evidence that an increase in overall short-term costs will be off-set by an improvement in longer-term clinical outcomes.
- The Appraisal Panel concluded, overall, that while the use of robot-assisted thoracic surgery shows promise, the current clinical and cost effectiveness evidence does not support routine adoption in NHS Wales. It noted, however, that there are three ongoing randomised controlled trials comparing robot-assisted thoracic surgery with VATS and expressed the hope that these might provide more reliable evidence of the possible short- and long-term clinical and system benefits on which to base future decisions. HTW will reconsider this Guidance when the results of these and other trials become available.

Responsibilities for consideration of this Guidance

Health Technology Wales (HTW) was established by Ministerial recommendation^{1,2} to support a strategic, national approach to the identification, appraisal and adoption of non-medicine health technologies into health and care settings. The HTW Appraisal Panel comprises senior representation from all Welsh boards with delegated authority to produce guidance ‘from NHS Wales, for NHS Wales’. The status of HTW guidance is ‘adopt or justify’. There is an expectation from Welsh Government that HTW guidance is implemented with adoption regularly audited by HTW.³

The guidance in this document is intended to assist Welsh care system decision makers to make evidence-informed decisions when determining the place of health technologies and thereby improve the quality of care services.

The content of this HTW guidance was based upon the evidence and factors available at the time of publication. An international evidence base was reviewed and external topic experts and HTW committee members consulted to contextualise available evidence to Wales. Readers are asked to consider the generalisability of the evidence reviewed to NHS Wales and that new trials and technologies may have emerged since first publication and the evidence presented may no longer be current. It is acknowledged that evidence constitutes only one of the sources needed for decision making and planning.

This guidance 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.

No part of this guidance may be used without the whole of the guidance being quoted in full. This guidance represents the view of HTW at the date noted. HTW guidance is not routinely updated. It may, however, be considered for review if requested by stakeholders, based upon the availability of new published evidence which is likely to materially change the guidance given.

Standard operating procedures outlining HTWs evidence review methods and framework for producing its guidance are available from the HTW website.

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Declarations of interest were sought from all reviewers. All contributions from reviewers were considered by HTWs Assessment Group. However, reviewers had no role in authorship or editorial control and the views expressed are those of Health Technology Wales.

Chair, Health Technology Wales Appraisal Panel

1. National Assembly for Wales, Health and Social Care Committee. Access to medical technologies in Wales. December 2014.
2. Response to Recommendations from the Health & Social Care Committee: Inquiry into Access to Medical Technologies in Wales. February 2015.
3. Gething, V. Letter to all Health Board Chairs re Funding for Sacral Nerve Stimulation in Wales. VG_01655_17. September 2017.



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