INAHTA Brief

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Title Bronchoscopic Treatment of Emphysema

Agency HTA Malaysia, Health Technology Assessment Section, Medical Development Division, Ministry of Health Malaysia
Level 4, Block E1, Parcel E, Presint 1,
Federal Government Administrative Center, 62590 Putrajaya, Malaysia
Tel: +603 88831229, Fax: +603 88831230; htamalaysia@moh.gov.my, www.moh.gov.my

Reference Health Technology Assessment Report
http://www.moh.gov.my/penerbitan/mymahtas/HTA/HTA-Bronchoscopic%20Treatment%20of%20Emphysema.pdf

Aim

Policy Question:

Should bronchoscopic lung volume reduction (BLVR) be part of routine clinical management for patients with severe emphysema in selected MOH hospitals?

Objective:

i. To assess the effectiveness and safety of BLVR treatment in patients with severe emphysema compared with standard medical treatment, sham bronchoscopy or surgical intervention, with regards to patient outcomes such as lung capacity/improvement in lung function, perioperative and postoperative mortality, health-related quality of life, quality adjusted life years (QALY) gained, and adverse events/complications.
ii. To assess the economic impacts of using BLVR treatment in patients with severe emphysema compared with standard medical treatment, sham bronchoscopy or surgical intervention.
iii. To assess the organizational and social aspects related to BLVR treatment.

Conclusions and results

A total of 80 records were identified through the Ovid interface, PubMed and references of retrieved articles. All the 80 records (no duplicates references) were found to be potentially relevant and were screened. After reading, appraising and applying the inclusion and exclusion criteria to the 63 full text articles, 17 full text articles were finally selected for this review whereby 12 were included in meta-analysis. The articles comprised 16 RCTs and one cost-effectiveness analysis.

The availability of evidence differs between BLVR treatments. Most of the evidence retrieved was related to the use of valves (EBV and IBV) and coils compared to other techniques (sealant, vapour ablation, and stents) which only rely either on a single RCT or absence of clinically meaningful outcomes.

There was fair to good level of retrievable evidence to suggest that as compared with standard medical treatment or sham bronchoscopy, EBV, unilateral IBV placement, sealant, and vapour ablation led to a significant improvements in lung function (FEV_1) and health-related QoL (SGRQ). For endobronchial coils, only participants with degree of air trapping (RV ≥225%) and heterogeneous emphysema distribution had greater magnitudes of treatment response (post-hoc analysis subgroup). Studies conducted on partial bilateral IBV placement, however, failed to find substantial clinical improvements at end of follow-up while airway bypass stents did not provide evidence for clinical effectiveness as it was unable to provide long-terms sustainable benefit. For exercise capacity, all BLVR techniques demonstrated a significant increase in 6MWD except for partial bilateral IBV placement which favoured control while endobronchial coils, vapour ablation, and airway bypass stent did not reach a significant difference.

With regard to safety, there was fair to good level of retrievable evidence to suggest that although there were no significant differences in mortality between intervention and control, adverse events were more common in participants treated with the BLVR. The occurrence of pneumothorax especially with valve placement; and increase in infectious and inflammatory events when using coils; probably being the most important.

There was evidence to suggest that endobronchial coils treatment was costly despite the clinical benefits for individual participant from the France healthcare perspective. In Germany, EBV was found to be cost-effective treatment strategy compared to medical management with an ICER below the commonly accepted threshold of € 50,000 per QALY over a wide range of assumptions and follow-up time frames. For other BLVR techniques, no cost-effectiveness analysis were retrieved.

Operative duration and hospital utilisation varies widely between BLVR treatments. Airway bypass stent seemed to have the longest procedure time whereas length of hospital stays tend to be longer in patient treated with sealant (AeriSeal) compared to other BLVR techniques.

Recommendation

Based on the above review, BLVR techniques using valves (EBV and unilateral IBV) seemed to have the potential to be a valuable option for management of patients with severe emphysema. Coil treatment appears promising only for participants with degree of air trapping (RV ≥225%) and heterogeneous emphysema distribution. Further studies are needed to provide more evidence for sealant, vapour ablation, airway bypass stents, and endobronchial coils. Valve treatment may be offered in selected centres in MOH hospitals that perform interventional bronchoscopy

regularly with expertise in various treatment modalities and may be offered as a bridge to lung transplant in patients with severe emphysema. Pulmonologists should be credentialed to perform BLVR.

Refinement of selection criteria for the respective techniques may have a significant impact on the results for the patient and close cooperation between pulmonologists and radiologist is an essential step in achieving this aim. In addition, patient's outcome research is warranted on the long term basis while cost implication should also be considered.

Methods

Literature search was conducted by an Information Specialist who searched for published articles pertaining to BLVR treatment in patient with severe emphysema. The following electronic databases were searched through the Ovid interface: Ovid MEDLINE® In-process and other Non-indexed citations and Ovid MEDLINE® 1946 to present, EBM Reviews - Health Technology Assessment (4th Quarter 2016), EBM Reviews - Cochrane Database of Systematic Review (2005 to Feb 2018), EBM Reviews - Cochrane Central Register of Controlled Trials (Jan 2018), EBM Reviews - Database of Abstracts of Reviews of Effects (1st Quarter 2016), EBM Reviews - NHS Economic Evaluation Database (1st Quarter 2016). Parallel searches were run in PubMed, US FDA and INAHTA database. No limits were applied to the search. Detailed search strategy is as in Appendix 3. The last search was performed on 23rd February 2018. Additional articles were identified from reviewing the references of retrieved articles. Risk of bias was assessed using the Cochrane Collaboration's tool for assessing risk of bias for Randomised Controlled Trial (RCT) and Critical Appraisal Skills Programme (CASP) checklist for Economic Evaluation. All full text articles were graded based on guidelines from the United States/Canadian Preventive Services Task Force.

Further research/reviews required

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Written by

Syful Azlie, Dr. Erni Zurina, MaHTAS, Malaysia