Technoleg Iechyd Cymru
Health Technology Wales

Topic Exploration Report

This report summarises the results of a brief exploration to establish the quantity and quality of existing high-level evidence on the procedure of interest.

Topic:	Abdominal compression with Stereotactic Ablative Body Radiotherapy (SABR) for people with liver, adrenal or inferior lung lesions
Topic proposer	Tom Rackley
Report identifier	RT11
Topic exploration report number:	TER039
Prepared by	Cedar (Cardiff & Vale University Health Board)
Report date	8 March 2019

Purpose

On behalf of Health Technology Wales, Cedar researchers conducted a rapid review of evidence on the implementation and use of abdominal compression with SABR for the treatment of patients with liver, adrenal and inferior lung lesions. This exploratory summary will inform the prioritisation of radiotherapy procedures to be introduced at Velindre Cancer Centre (VCC), alongside expert opinion and other considerations. It could also be used to clarify the scope of an evidence appraisal. Some of the background information and resource impact considerations was submitted by clinical teams at VCC.

Background

Motion management is a key consideration in the delivery of stereotactic ablative body radiotherapy (SABR) as movement of organs, that are to be targeted, can result in normal tissue being inadvertently treated. Motion can result from the respiratory, skeletal muscular, cardiac or gastrointestinal systems. Abdominal compression is one technique to control respiratory movement; compression plates are used which force the patient to shallow breathe thus limiting organ movement.

Proposed PICO	
Population	Patients with adrenal, liver or lung lesions treated with stereotactic ablative body radiotherapy (SABR).
Intervention	Abdominal compression
Comparator	No abdominal compression
Outcome measures	Reduction in respiratory organ motion

Summary of findings

There is a paucity of evidence particularly high quality evidence and most published studies that were identified in this scoping exercise are case series. Insufficient evidence exists to conduct a rapid review. No UK guidelines were identified that included recommendations on the use of abdominal compression or more generally about motion management. However several organisations have published recommendations which are listed in the appendix. The SABR consortium guidelines stipulates a minimum standard: "a means of quantifying respiratory motion for individual patients before treatment must be available. For any observed respiratory motion of >5mm attempts should be made to reduce this." One RCT was identified comparing 2 abdominal compression devices for patients who either had non-small cell lung cancer or oligometastases in the lung. One non-randomised comparative study was identified comparing patients with intrahepatic tumours who received abdominal compression with those who were free-breathing. It was noted that gender and BMI influence the effectiveness of abdominal compression. Cole et al. (2014) provide an overview of motion management in non-small cell lung cancer suggesting that abdominal compression may be unsuitable for obese patients or those with poor respiratory function.

Economic impact

No economic evaluations of abdominal compression were identified. It was proposed that a training and competence package to cover 65 staff would be required for abdominal compression to be fully utilised at VCC. Two staff would undertake all the training of others. Sessions would be held for staff to attend lasting approximately 30 minutes. Each session is likely to be attended by five staff implying 13 sessions may need to be undertaken. Two additional abdominal compression kits would need to be purchased as there is currently only one in the department. This allows CT and two treatments units' access to the kit. The more this device is used, and experience is gained, the more sustainable it is likely to become. A liver fiducial service which can be used to better assess motion and visualise the effect compression has on it has been introduced into the department.

Prioritisation criteria

Clinical impact (Potential for the technology to have an impact on patient-related health outcomes):
Insufficient evidence to be able to fully assess.

Budget impact (Impact of the technology on health care spending):
Insufficient evidence to be able to fully assess.

Population impact (The size of the population that would be affected by the technology):
Approximately 20 patients per year.

Equity (The technology has the potential to introduce, increase, or decrease equity in health status):
No equity issues identified.

Questions for researcher

Based on the sources you have identified, is your impression that the evidence is likely to:

- favour implementation of the procedure?
- favour standard care?
- be inconclusive?

The evidence is likely to favour implementation of the procedure. Having access to a motion management technique is important in the delivery of SABR and a motion management strategy should be in place as indicated by various recommendations. From the literature the use of abdominal compression needs to be assessed on a case by case basis but where applicable there is a potential to reduce normal tissue being treated and therefore reduce toxicity.

Questions for topic proposer

- Do you have a procedure for individual patient assessment as to their suitability for abdominal compression?

Topic proposer response (25 February 2019)

1. We would test equipment on patient before performing any treatment planning scans to test tolerability.
2. We would perform a 4DCT planning scan with and without compression to compare motion and likely benefit. (If compression does not reduce motion then it would not be used in that patient).

Appendix – Brief literature search results

Resource	Results
UK guidelines and guidance	
e.g. NICE; Healthcare Improvement Scotland; Guidelines International Network; SIGN	No guidelines were identified that included recommendations on the use of abdominal compression or more generally about motion management. However the following organizations have published recommendations that are relevant to this report topic with regard to motion management: • The management of respiratory motion in radiation oncology report of AAPM Task Group 76 • UK SABR Consortium: Stereotactic Ablative Body Radiation Therapy (SABR): A Resource • European Organization for Research and Treatment of Cancer (EORTC) • recommendations for planning and delivery of high-dose, high precision • radiotherapy for lung cancer - see Table 2 for recommendations • Australian and New Zealand Faculty of Radiation Oncology (FRO) Guidelines for safe practice of stereotactic body (ablative) radiation therapy – provides some advice but refers specifically to AAPM Task Group Report 76.
Secondary literature and economic evaluations	
e.g.Cochrane library; Medline *systematic reviews, meta-analyses, economic evaluations*	No systematic reviews or meta-analyses or economic evaluations were identified on the use of abdominal compression for SABR
Primary studies	
Medline *RCTs; observational studies*	Paucity of evidence particularly high level evidence. Mostly case series. Lung: identified 1 RCT comparing 2 abdominal compression devices for patients who either had non-small cell lung cancer or oligometastases in the lung Liver: identified 1 non-randomised comparative study comparing patients who received abdominal compression with those who were free-breathing.
Ongoing secondary research	
Clinicaltrials.gov	No ongoing trials identified
Other sources	
Literature identified in scoping this topic	Cole 2014 provides on overview of motion management in non-small cell lung cancer. Table 2 presents the disadvantages and advantages of each technique and notes for abdominal compression: • May be unsuitable for obese patients or those with poor respiratory function. Can lead to more erratic breathing in some instances. Requires regular imaging due to difficulties associated with plate position reproducibility.

Date of search:	5th December 2018
Concepts searched:	stereotactic radiotherapy, SABR, SBRT, motion management, abdominal compression