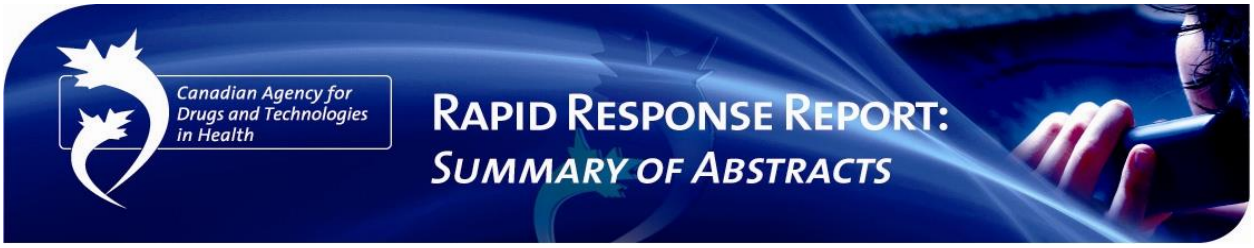

TITLE: Yttrium-90 Microsphere Radioembolization for the Treatment of Primary or Secondary Liver Cancer: Clinical Effectiveness, Cost-Effectiveness, and Guidelines

DATE: 24 February 2016

RESEARCH QUESTIONS

1. What is the clinical effectiveness of Yttrium-90 microsphere radioembolization for the treatment of primary or secondary liver tumors?

2. What is the cost-effectiveness of Yttrium-90 microsphere radioembolization for the treatment of primary or secondary liver tumors?

3. What are the evidence-based guidelines regarding Yttrium-90 microsphere radioembolization for the treatment of primary or secondary liver tumors?

KEY FINDINGS

Eleven systematic reviews/meta-analyses and two economic evaluations were identified regarding the clinical and cost-effectiveness of Yttrium-90 microsphere radioembolization for the treatment of primary or secondary liver cancer.

METHODS

This report makes use of a literature search conducted for a previous CADTH report. The original literature search was conducted in May 2011 on key resources including PubMed, The Cochrane Library, University of York Centre for Reviews and Dissemination (CRD) databases, Canadian and major international health technology agencies, as well as a focused Internet search. No filters were applied to limit retrieval by study type. Where possible, retrieval was limited to the human population. The initial search was also limited to English-language documents published between September 1, 2007 and May 30, 2011. For the current report, database searches were rerun on February 12, 2016 to capture any articles published since the

initial search date. The search of major health technology agencies was also updated to include documents published since May 2011.

The summary of findings was prepared from the abstracts of the relevant information. Please note that data contained in abstracts may not always be an accurate reflection of the data contained within the full article.

SELECTION CRITERIA

One reviewer screened citations and selected studies based on the inclusion criteria presented in Table 1.

Table 1: Selection Criteria

Population	Adult patients with primary or secondary cancerous liver tumors
Intervention	Yttrium-90 microsphere radioembolization
Comparator	Other palliative options; Other cancer treatment options; Comparator not required for clinical question
Outcomes	Q1: Tumor reduction, time to progression, tumor progression, survival, clinical benefit, efficacy, safety, quality of life Q2: Cost-effectiveness Q3: Guidelines for use, optimal use
Study Designs	Health technology assessments, systematic reviews, meta-analyses, randomized controlled trials, non-randomized studies, economic evaluations, evidence-based guidelines

RESULTS

Rapid Response reports are organized so that the higher quality evidence is presented first. Therefore, health technology assessment reports, systematic reviews, and meta-analyses are presented first. These are followed by randomized controlled trials, non-randomized studies, economic evaluations, and evidence-based guidelines.

Eleven systematic reviews/meta-analyses and two economic evaluations were identified regarding the clinical and cost-effectiveness of Yttrium-90 microsphere radioembolization for the treatment of primary or secondary liver cancer. Due to the large number of systematic reviews identified, non-randomized studies published after 2014 are presented in the appendix. Non-randomized studies published previous to 2015 should have been captured in the systematic reviews and are not included in the list. No health technology assessments or evidence-based guidelines were identified.

Additional references of potential interest are provided in the appendix.

OVERALL SUMMARY OF FINDINGS

Eleven systematic reviews/meta-analyses were identified in the literature search. A summary of these articles is provided in Table 2. Many of the reviews[1-2,5-10] concluded that Yttrium-90 (Y90) was a safe and/or effective treatment for liver tumors.

One of the economic evaluations[12] suggested that Yttrium-90 was a clinically and cost-effective treatment option. The second economic evaluation[13] calculated the median cost for two

treatments: Y90 was $25,243 and drug-eluting beads with doxorubicin (DEBDOX) was $13,400. It concluded that both treatments were safe and effective, but the "the size of the lesions, total lesion volume, and expense of therapy need to be considered when choosing which method is optimal."

Table 2: Summary of Systematic Reviews/Meta-Analyses

Author, Year	Number of Included studies; Number of Patients (n)	Comparator(s)	Outcomes
Teo, 2016[1]	7 studies; n=312	No comparator	"Unilobar Y90 SIRT results in significant hypertrophy of the contralateral liver lobe. The rate of hypertrophy seems to be slower than that achieved by other methods"
Al-Adra, 2015[2]	12 studies; n=NR	No comparator	"The use of [Y90] should be considered in the list of available treatment options for ICC"
Boehm, 2015[3]	20 studies; n=657	HAI, TACE, DEB-TACE	"For patients with unresectable ICC treated with HAT, HAI offered the best outcomes in terms of tumor response and survival but may be limited by toxicity"
Kuei, 2015[4]	NR	No comparator	NR
Zhang, 2015[5]	8 studies; n=1,499	TACE	"…TARE (Y90) is significantly better in OS, 3-year OS rates, TTP, hospitalization time days and some complications for patients with HCC"
Devcic, 2014[6]	12 studies; n=NR	No comparator	"This meta-analysis confirms radioembolization to be an effective treatment option for patients with hepatic mNET. The pooled data demonstrated a high response rate and improved survival for patients responding to therapy"
Saxena, 2014[7]	20 studies; n=979	No comparator	"[Y90] is a safe and effective treatment of CRCLM in the salvage setting and should be more widely utilized"
Rosenbaum, 2013[8]	n=13, n=NR	No comparator	"…approximately 50% of salvage patients with colorectal cancer liver metastases survive more than 12 mo after treatment with [Y90], either as monotherapy or in combination with chemotherapy."
Smits, 2013[9]	n=6, n=198	No comparator	"The results from the analyzed studies consistently show that [Y90] is a safe and effective treatment option for BCLM patients"
Lau, 2011[10]	NR	No comparator	"[Y90] microspheres are a safe and well-tolerated therapy for unresectable HCC"
Nachtnebel, 2011[11]	NR	NR	NR

BCLM = Breast cancer liver metastases; DEB-TACE = Drug-eluting bead TACE; HAI = Hepatic arterial infusion; HAT = Hepatic artery based therapies; HCC = Hepatocellular carcinoma; ICC = Intrahepatic cholangiocarcinoma; mNET = Metastatic neuroendocrine tumors; NR = Not reported; OS = Overall survival; SIRT = Selective internal radiation therapy; TACE = Transcatheter arterial chemoembolization; TARE = Transarterial radioembolization; TTP = Time to progression; Y90 = Yttrium 90

REFERENCES SUMMARIZED

Health Technology Assessments

No literature identified.

Systematic Reviews and Meta-analyses

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Randomized Controlled Trials
No literature identified.

Non-Randomized Studies
Due to the large number of systematic reviews identified, non-randomized studies published after 2014 are presented in the appendix. Non-randomized studies previous to 2015 should have been captured in the systematic reviews and are not included in the list.

Economic Evaluations

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PubMed: PM21508068

Guidelines and Recommendations
No literature identified.

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APPENDIX – FURTHER INFORMATION:

Previous CADTH Reports

14. Yttrium-90 microspheres for cancer patients with primary or secondary liver tumors: clinical and cost-effectiveness [Internet]. Ottawa: CADTH; 2011 Jun 13. (Rapid response report: summary of abstracts). [cited 2016 Feb 22]. Available from: https://www.cadth.ca/media/pdf/htis/june-2011/RB0369_Yttrium-90_Microspheres_Final.pdf

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