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Use of the SpaceOAR™ hydrogel rectal spacer during prostate radiotherapy

English summary

Une production de l'Institut national d'excellence en santé et en services sociaux (INESSS)

Québec

SUMMARY

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Introduction

Prostate cancer is the most frequently diagnosed cancer and the third leading cause of cancer death in men in Québec. Radiotherapy is a well-established and widely used treatment modality for this type of cancer. Because of its proximity to the prostate, the rectum is the main organ at risk (OAR) during prostate radiotherapy, and rectal toxicity (proctitis, bleeding, pain, fistula, ulceration and incontinence) is one of the main concerns.

The SpaceOAR™ Hydrogel System (Boston Scientific, USA), approved by Health Canada in 2016, is an option, for men with prostate cancer, for reducing the risk of prostate radiotherapy-induced rectal toxicity. This resorbable polyethylene glycol-based hydrogel injected into the retroprostatic space is designed to temporarily move the anterior rectal wall away from the prostate during radiotherapy. The objective is to reduce the high radiation doses absorbed by the rectal wall and, consequently, the resulting rectal toxicity. The hydrogel rectal spacer maintains the space thus created for about 3 months, after which it is completely absorbed by the body over time.

Given the potential benefits of the SpaceOAR™ for patients undergoing prostate radiotherapy, the Programme québécois de cancérologie (PQC) of the Ministère de la Santé et des Services sociaux asked the Institut national d'excellence en santé et en services sociaux (INESSS) to prepare a report on the clinical efficacy and utility, the safety and the efficiency of this new medical device. The purpose of this request to INESSS was to evaluate the use of the SpaceOAR™ Hydrogel System in prostate cancer patients undergoing prostate radiotherapy in Québec's health-care facilities.

Methods

We conducted a rapid review of the literature data and the data provided by the manufacturer to document the safety, clinical efficacy, clinical utility (impact on toxicity and quality of life) and efficiency of SpaceOAR™ hydrogel. The literature examined was that published up to January 2020 on patients with localized or locally advanced prostate cancer treated with external beam radiotherapy (conformal intensity-modulated radiotherapy [IMRT], volumetric modulated arc therapy [VMAT], stereotactic ablation radiotherapy [SABR]) or brachytherapy combined or not with external beam radiotherapy. The scientific data and experiential and contextual data were integrated into a deliberative process that led to a number of findings and recommendations.

Results

The integration of the scientific, experiential and contextual data led to the following findings:

- There is a need to reduce radiotherapy-induced rectal toxicity, particularly in patients at increased risk for such toxicity, even if other means are used to reduce this toxicity (image guidance, fiducial markers, radiotherapy technique [VMAT, brachytherapy]). SpaceOAR™ hydrogel is a complementary modality;

Clinical utility

- Hydrogel reduces grade ≥ 2 late rectal toxicity (during IMRT or VMAT [moderate level of evidence] or low-dose SABR [low level of evidence]) and better preserves bowel quality of life (data available for IMRT only [low level of evidence]);
- Although the clinical impact of reducing rectal toxicity may appear small from a populational perspective, the avoidance of grade ≥ 2 toxicity can have a large impact from an individual perspective;
- Hydrogel may reduce grade ≥ 2 late genitourinary toxicity (only during low-dose SABR [moderate level of evidence]) and improve urinary quality of life (data available for IMRT only [low level of evidence]). However, the experts note the absence of a scientific basis to explain these effects and the weakness of the evidence;
- Overall, hydrogel has no impact on sexual quality of life (data available for IMRT only [low level of evidence]). The data are insufficient to rule on such an impact in patients with a better baseline sexual quality of life;
- Hydrogel has no impact on gastrointestinal or genitourinary toxicity when used during high-dose-rate brachytherapy followed by external beam radiotherapy (low level of evidence). The data are insufficient to rule on the impact of hydrogel on gastrointestinal toxicity in patients treated with low-dose-rate brachytherapy;

Procedure

- The procedure is quick, is performed under local anesthesia and at the same time as fiducial marker implantation, and does not involve an additional visit for the patient. However, it may be poorly tolerated by some patients;
- An MRI is necessary for treatment planning after hydrogel implantation. Most of Québec’s radiotherapy centres do not have a MRI scanner dedicated for radiation oncology and will therefore have to go through the hospital's imaging department;
- The procedure is subject to a learning curve, but it seems to be more difficult to fully master than the literature suggests. Although clinicians with experience with transperineal procedures may become comfortable with the technique more quickly, it is a more difficult and riskier procedure than fiducial marker placement;
- The procedural adverse events associated with hydrogel implantation are not negligible and call into question the procedure’s risk-benefit ratio;

- The procedure's risk-benefit ratio is not favourable for all patients;

Economic aspect

- The efficiency data suggest that the procedure involves significant costs and are accompanied by considerable uncertainty regarding the long-term efficacy and safety data.

Perspectives of the experts consulted

The scientific, contextual and experiential data were discussed with the members of the advisory committee and the Comité de l'évolution des pratiques en oncologie (CEPO). Several concerns were raised by the experts consulted during this evaluation of the SpaceOAR™, including the following:

- The need to reduce rectal toxicity in prostate cancer patients treated with radiotherapy;
- The fact that the frequency and severity of rectal toxicity appear to be greater in clinical practice than what is reported in the literature;
- The relative complexity of the procedure and the experience and expertise required to use hydrogel;
- Rare but significant adverse events and complications due to hydrogel and the procedure, including those identified in the population-based pharmacovigilance data or the scientific literature;
- The fact that certain patients at increased risk for radiotherapy-induced rectal toxicity may also be at increased risk for adverse events associated with the procedure;
- The fact that magnetic resonance imaging (MRI) equipment is needed to visualize the hydrogel spacer to ensure proper delineation of the anatomical contours during treatment planning. This requires adjustments within the radiotherapy departments and to the workflow;
- The weakness of the clinical utility data, including the absence of sufficient follow-up to detect late rectal toxicity (> 3 years), the risk of bias or the placebo effect for quality-of-life outcomes, not all of which are consistent with the toxicity and dosimetry outcomes;
- The significant costs of the procedure.

Nevertheless, the experts consulted recognize that this emerging technology is promising. Despite the uncertainty surrounding the selection of appropriate patients and the demonstration of its clinical utility in these patients, some believe that hydrogel could have a certain degree of utility in rigorously selected patients. For example, its use could be considered in those whose medical condition is likely to increase the risk of rectal toxicity very significantly or in those for whom significant deviations in rectal dose constraints are encountered during treatment planning. It would, however, be contraindicated in certain

specific situations (e.g., the presence of an active bleeding disorder or a strong likelihood of experiencing difficulty when creating a space for hydrogel implantation).

Summary of deliberations

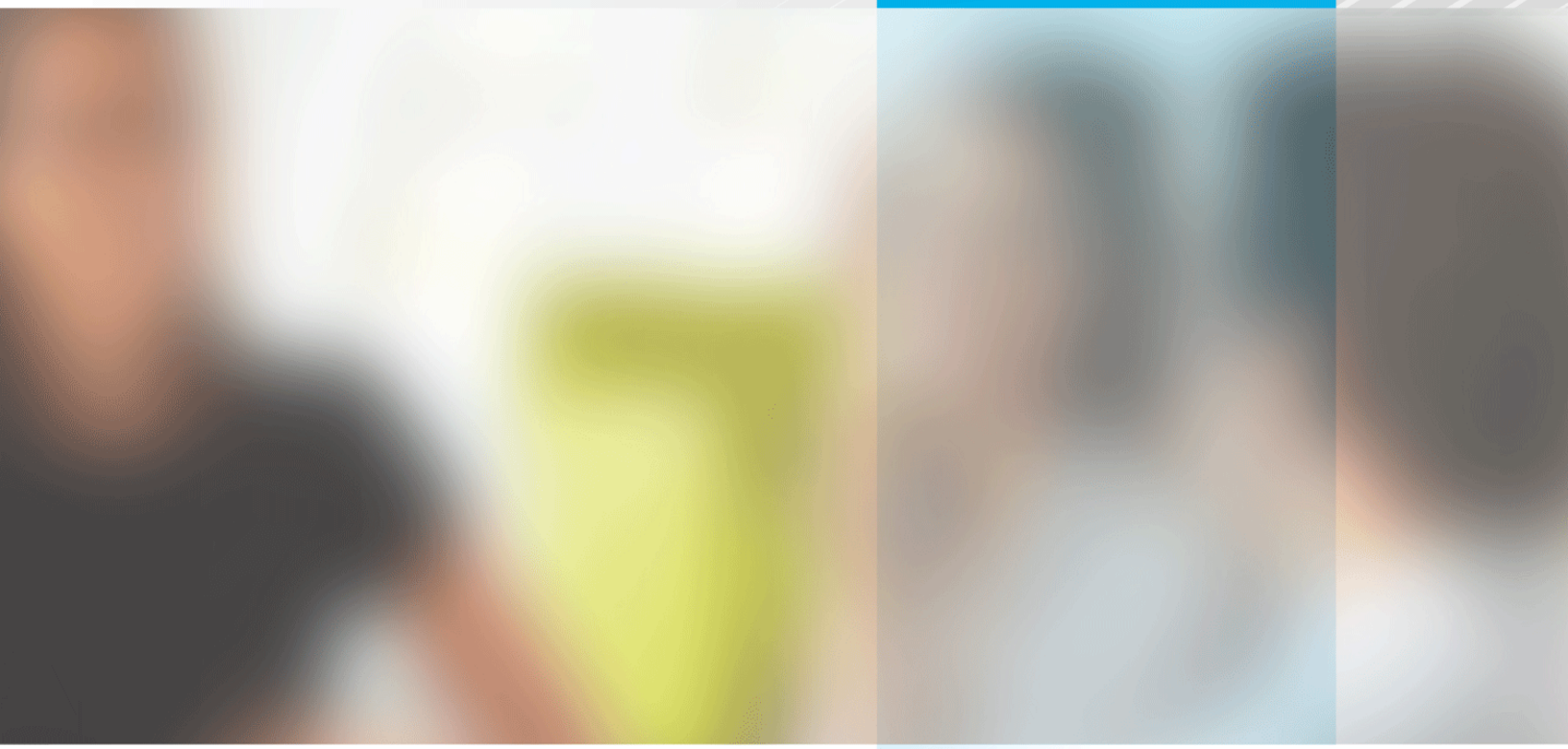
In light of the analysis of the best available data, and given the significant uncertainty regarding the product's therapeutic value, the members of INESSS's Comité d'excellence clinique en services de santé (CEC – santé) consider that public coverage for the SpaceOAR™ is not a fair and reasonable option. Additional data are considered necessary to support the introduction of this technology.

Reasons for the unanimous position

- The weakness of the data, including the absence of data for groups considered to be at higher risk for rectal toxicity;
- The risk-benefit ratio, which does not appear to support the use of this technology;
- The possibility of major complications for patients;
- The possibility of an increased risk of complications for patients at increased risk for rectal toxicity;
- The observed dosimetric benefit (sometimes significant) in the data presented, which appears to offer only a small clinical benefit;
- The contradiction between the positions taken by other organizations;
- The potential difficulty of access to MRI.

RECOMMENDATION

Given the considerable uncertainty regarding the therapeutic value of the SpaceOAR™, INESSS considers that this treatment modality should only be offered in an experimental setting. More efficacy and safety data are needed to support the introduction of this technology.



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