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Original article

Oncological and functional results of robotic salvage radical prostatectomy after permanent brachytherapy implants

Prostatectomie de rattrapage robotisée après curiethérapie de prostate par implants permanents : résultats oncologiques et fonctionnels

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ABSTRACT

Purpose. – To evaluate the feasibility of robotic salvage prostatectomy for local recurrence after permanent brachytherapy implants for prostate cancer.
Patients and methods. – Seven patients were operated by robotic salvage prostatectomy with or without pelvic lymph node dissection between October 2007 and March 2012, for a local recurrence after iodine 125 permanent brachytherapy implants. Local recurrence was proved by prostate biopsies, once biochemical relapse was diagnosed and imaging assessment performed.
Results. – The average age of a patient at the time of diagnosis was 66 years (62–71 years). The median nadir prostate specific antigen (PSA) serum concentration after brachytherapy was 1.29 ng/mL (0.6–2.1 ng/mL), obtained after a median of 12 months (7–21 months). The average [PSA] before robotic salvage prostatectomy was 6.60 ng/mL (4.17–13.80 ng/mL). [PSA] at 1 and 3 months after prostatectomy was less than 0.05 ng/mL in five patients. [PSA] remained below 0.05 ng/mL for six patients at 12 and 24 months. One month after robotic salvage prostatectomy, all patients had at least partial urinary incontinence. At 12 and 24 months after robotic salvage prostatectomy four patients have regained full urinary continence. In terms of erectile function at 24 months, three patients retained erectile function with possible sexual intercourse.
Conclusion. – Robotic salvage prostatectomy appears to be a reliable treatment in terms of oncological outcome with convincing results both for urinary continence and erectile function for selected patients with local recurrence after permanent brachytherapy implants.

Mots clés :
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Continence urinaire

RÉSUMÉ

Objectif de l'étude. – Évaluer la faisabilité d'une prostatectomie de rattrapage robotisée pour une rechute locale après une curiethérapie de prostate initiale par implants permanents.
Patients et méthodes. – D'octobre 2007 à mars 2012, sept patients pris initialement en charge par curiethérapie de prostate par iode 125, en situation de rechute locale, ont bénéficié d'une prostatectomie robotisée avec ou sans curage pelvien ganglionnaire. Les patients étaient en situation de rechute biologique selon la concentration sérique de d'antigène spécifique de la prostate et avaient eu un bilan d'imagerie complet. Le diagnostic de rechute locale a été confirmé par les biopsies prostatiques.

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Résultats. – L'âge moyen des patients au moment du diagnostic était de 66 ans (62–71). Le nadir médian de la concentration sérique de d'antigène spécifique de la prostate à un an de la curiethérapie était de 1,29 ng/mL (0,6–2,1 mg/mL). La concentration moyenne d'antigène spécifique de la prostate lors du traitement de rattrapage par prostatectomie robotisée était de 6,60 ng/mL (4,17–13,80 ng/mL). La concentration sérique de d'antigène spécifique de la prostate était à 1 et 3 mois de la prostatectomie de moins de 0,05 ng/mL pour cinq patients. À 12 et 24 mois, elle est restée inférieure à 0,05 ng/mL pour six patients. Un mois après la chirurgie, tous les patients souffraient d'une incontinence urinaire partielle. À 12 et 24 mois, cinq patients avaient une continence parfaite. Pour ce qui concerne la fonction érectile, à 24 mois, trois patients ont conservé une fonction érectile permettant les rapports.
Conclusion. – La prostatectomie de rattrapage robotisée réalisée pour des patients sélectionnés en situation de rechute locale après curiethérapie est une option thérapeutique à considérer, avec des résultats fiables et des résultats fonctionnels probants en termes de continence et de conservation érectile.

1. Introduction

Prostate brachytherapy is now recognized as one of the treatment options for patients with a low recurrence risk (T1-T2 according to D'Amico classification) and low prostate specific antigen blood levels (PSA, 10 ng/mL or less with a Gleason score of 6) [1–5]. The oncological outcomes for prostate brachytherapy with a permanent implant are comparable to those for surgery and external beam radiation therapy with biochemical control rate of around 90% over 10 years. The outcome was similar in patients of the intermediate-risk group of D'Amico classification, with a T1-T2 tumor, but with only one poor prognostic factor: Gleason 7 (3 + 4) or PSA between 10 and 15 ng/mL [6]. Indeed, for patients with several bad prognostic factors or a Gleason 7 tumor with grade 4 predominance, the results appeared less satisfactory [7,8]. Technically, brachytherapy can only be achieved if the prostate volume is 50 cm^3 or less prior to permanent seed implantation as urinary toxicity increases with an increase in the volume. In cases where the volume is at least 50 cm^3 and no associated urinary tract ailments, treatment with neoadjuvant hormone therapy for a period not exceeding 6 months cannot be established [6].

Hennequin et al. excluded patients with urinary ailment history, and with an initial international prostrate symptom score (IPSS) higher than 10–15 or with a urine output less than 10 mL/s for a prostate brachytherapy treatment with permanent implants (due to a risk of exposing them to increased urinary toxicity) [6]. In case of biochemical and local relapse following initial treatment with brachytherapy, several other therapeutic options could be explored: hormone therapy, focused therapies such as cryotherapy or high-intensity focused ultrasound and surgery [9]. Salvage prostatectomy with very high morbidity rate had already been described in previous studies [10]. More recent studies have reported a good biochemical and local control with salvage prostatectomy after initial treatment with brachytherapy or external radiation therapy, with acceptable morbidity rates [11–13].

In this study, we report our experience with seven patients that were treated with robotic salvage prostatectomy after initial treatment with permanent implants.

2. Patients and methods

Between October 2007 and March 2012, seven patients were operated by radical salvage prostatectomy with or without pelvic lymph node dissection; the operations were performed by the same surgeon, for a local recurrence after iodine 125 seed implant brachytherapy. Biochemical relapse was diagnosed by a rise in blood PSA levels, according to the Phoenix criteria (nadir + 2 ng/mL), which is more sensitive and specific than the American Society for Radiation Oncology criteria (three successive blood [PSA] increases) [14]. All patients underwent an imaging assessment including a full thoracoabdominal-pelvic scan coupled with a prostate MRI. Nuclear imaging or positron emission bone scan with (^{18}F)-fluorocholine was performed depending on its availability. This assessment was consistently made to eliminate locally advanced disease, lymph node involvement or the presence of distant metastasis.

Histological evidence for local recurrence was systematically verified by performing new prostate biopsies. Monitoring the local control of the disease consisted of checking blood [PSA] at 1, 3, 6 and 12 months after surgery. The operative morbidity, urinary and sexual status were regularly reviewed at the follow-up consultations.

3. Results

The average age of a patient at the time of diagnosis was 66 years (62–71 years). The average [PSA] at initial diagnosis was 7.13 ng/mL (4.9–9.94). Clinical stage was T2 or less, with a Gleason score 7 or less, but consisting of a grade 3 majority. Patient characteristics are summarized in Table 1. The characteristics of the implants for patients who had local recurrence are as follows: the average number of ^{125}I seeds implanted was 77 (58–107) for a mean prostate volume of 39.33 mL (29–62 mL). The dose delivered to 90% of the prostate (D90), estimated on the CT scan performed on the first day after the seed implantation, was more than 145 Gy (167–190.8 Gy), in agreement with the Groupe européen de curiethérapie (GEC) and the European Society for Radiotherapy & Oncology (ESTRO) recommendations [15]. The mean prostate volumes that received 100% (V100) and 150% (V150) of the prescribed dose was 97.7% (94.6–100%) and 69.3% (63.66–76.7%), respectively, in the scan on day one. A new dosimetry control carried out on day 30 showed a mean value of 87.3% for V100 (78.2–94.52%) and 61.8% for V150 (43.4–68.91%). The D90 on day 30 was 137.2 Gy (111.3–163.8 Gy). Dosimetry data are summarized in Table 2.

The median nadir [PSA] after brachytherapy was 1.29 ng/mL (0.6–2.1 ng/mL) after a median of 12 months (7–21 months). The average [PSA] before salvage surgery was 6.60 ng/mL (4.17–13.80 ng/mL). The median delay before biochemical relapse was 38 months (19–81 months), with an average [PSA] doubling time of 13 months (5–24 months). The median time from implantation of Iodine seeds to surgery was 46 months (26–99 months). In five patients, the Gleason score in new biopsies was worse compared to biopsies prior to brachytherapy, while for two other patients the Gleason score remained unchanged in the new biopsies. In four patients, we found that the Gleason score worsened in new biopsies in the final histological analysis of the prostatectomy specimens; it remained the same in two patients, and altered from Gleason 9 to Gleason 8 in a single patient. Two patients underwent