



^{18}F -FDG PET/CT Imaging of Boari Flap Mimicking Urothelial Cancer Recurrence

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World J Nuclear Med 2022;21:161–162.

Abstract

A 63-year-old man underwent distal ureterectomy as a treatment for urothelial carcinoma of the ureter. Reconstruction of the urinary system was accomplished by tubularizing part of the bladder roof (Boari flap). A year later, metastatic evaluation with ^{18}F -fluorodeoxyglucose positron emission tomography/computed tomography (^{18}F -FDG PET/CT) showed high metabolic activity in the reconstructed area. Thorough evaluation confirmed the presence of a bladder diverticulum (the Boari flap) with no evidence of malignancy. We present the first ^{18}F -FDG PET/CT images of a Boari flap in the literature.

Keywords

- ▶ ^{18}F -FDG PET/CT
- ▶ Boari flap
- ▶ local recurrence

Introduction

Reconstruction of the distal ureter after surgical resection or trauma (from external sources or after endoscopic procedures) is one of the challenges in urology. The simplest surgical procedure for correcting lower ureteral injury is direct reimplantation of the ureter with or without upward pulling and fixing of the bladder to the psoas muscle (psoas hitch). When a longer segment of ureter should be bridged, a Boari flap can be considered.¹ With this flap, up to 15 cm of ureter can be replaced. It is constructed by harvesting a flap from the dome of the bladder, rotating it upward, tubularizing it and anastomosing it to the proximal healthy ureter. Higher injuries usually require the use of bowel segments (ileal ureter) or the contralateral ureter (transureteric ureterostomy) for repair.

Case Report

A 63-year-old male presented with painless hematuria and underwent evaluation that included computed tomography (CT) abdomen and pelvis using the urography protocol (CTU), urinary cytology, and cystoscopy. Nonmuscle-invasive high-

grade urothelial bladder carcinoma and carcinoma in situ were found and resected. Adjuvant intravesical immunotherapy with bacillus Calmette–Guerin was given (6 induction doses and maintenance). During follow-up 47 months after resection of the primary tumor, CTU disclosed new ureterohydronephrosis and a filling defect in the left distal ureter. The patient underwent distal ureterectomy and Boari flap reconstruction. Pathological evaluation showed carcinoma in situ of the ureter. A year later, the surgery patient underwent ^{18}F -fluorodeoxyglucose positron emission tomography/computed tomography (^{18}F -FDG PET/CT) (→Fig. 1) as part of the oncologic follow-up.² Homogeneous concentration of the radiotracer in the bladder and in the left distal part of the reimplanted ureter was noticed. This was interpreted as local recurrence. Cystoscopy, including surveillance of the flap and urinary cytology, confirmed the absence of any malignancy. We concluded that this is the normal appearance of a Boari flap with ^{18}F -FDG PET/CT.

Discussion

We present a case of a patient who underwent resection of the distal ureter and reconstruction of the urinary system

DOI <https://doi.org/10.1055/s-0042-1750340>.
ISSN 1450-1147.

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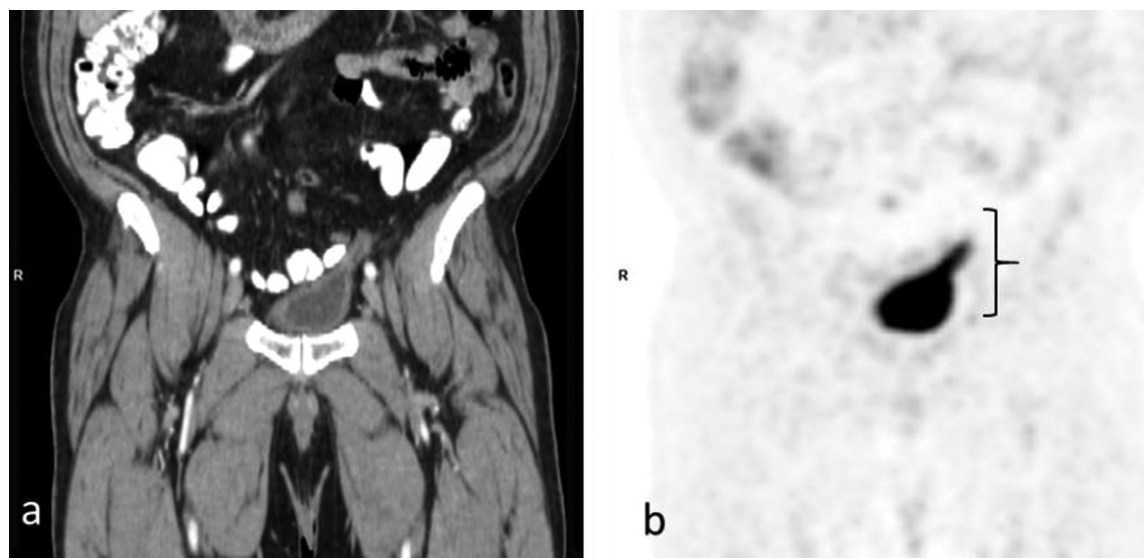


Fig. 1 Coronal view of ¹⁸F-fluorodeoxyglucose computed tomography (A) and positron emission tomography (B) demonstrating homogeneous concentration of the radiotracer in the bladder and in the left distal part of the reimplanted ureter (*black brace*). No evidence of stricture or dilatation of the ureter, and no pathological focal enhancement noticed on the computed tomography.

with a tubularized bladder flap—Boari flap. This surgery creates a bladder diverticulum, and since it was exactly where the cancer has been prior to surgery, it was misinterpreted as tumor recurrence. Thorough investigation confirmed the absence of tumor recurrence.

Boari flap reconstruction is not an uncommon procedure in urology. This technique is useful for oncological reasons: to repair traumatic injury and in benign cases, for example, resection of desmoid tumor.^{1–3} It can be performed either openly or laparoscopically. PET/CT readers are quite familiar with multiple pitfalls of FDG uptake and concentration especially in urological context. This case is an additional example of FDG retention in the postsurgical changes in the distal part of the reimplanted ureter that PET/CT interpreters should be familiar with its unique look.

Ethical Approval

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. For this type of study, formal consent is not required.

Informed Consent

The requirement to obtain informed consent was waived

Availability of Data and Material

Data sharing not applicable to this article as no datasets were generated or analyzed during the current study

Competing Interests

The authors declare that they have no competing interests

Authors' Contributions

All authors contributed to the manuscript—Prof. Gofrit and Dr. Fishberg presented and described the case and the urological procedure and follow-up.

Dr. Orevi described the radiological findings and their implications.

Funding

There is no source of funding.

Conflict of interest

Sharon E. Fishberg, Ofer N. Gofrit, and Marina Orevi declare that they have no conflict of interest.

Acknowledgments

Not available.

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