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LETTER TO THE EDITOR

Are we ready for day-case partial nephrectomy?

Jean-Christophe Bernhard[1,2] · Anne Payan[3] · Henri Bensadoun[1] · François Cornelis[2,4] · Grégory Pierquet[1] · Gilles Pasticier[1] · Grégoire Robert[1] · Grégoire Capon[1] · Alain Ravaud[2,5] · Jean-Marie Ferriere[1]

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Abstract Fast-track and day-case surgeries are gaining more and more importance. Their development was eased by the diffusion of minimal invasive surgical strategies and the consequential morbidity reduction. In the field of kidney cancer, seven cases of ambulatory radical nephrectomy were previously reported in the international literature. Regarding robotic partial nephrectomy (PN), short postoperative pathways resulting in patients' discharge on postoperative day 1 were shown to be safe and feasible. We report our initial experience of robot-assisted PN discharged on postoperative day zero and discuss the criteria for adequate patient selection. Indeed, outpatient PN will obviously not be suitable for all patients, and careful selection will be mandatory. Both specific baseline patient's factors and postoperative events will have to be recognized for the first ones and prevented for the second ones. Safety, patient satisfaction, cost efficiency, and reproducibility will be the key factors to assess and promote day-case PN.

Keywords Kidney cancer · Day-case · Partial nephrectomy · Outpatient · Robotic assistance

Kidney cancer's incidence regularly increased worldwide over the past 30 years and especially in young patients [1, 2]. Concomitantly, nephron-sparing surgery (NSS) was set up as the standard of care for all cT1 tumors [1, 3]. More recently, with the introduction and diffusion of robotic assistance, the proportion of minimal invasive partial nephrectomy (MIPN) regularly increased. As an example, in France, between 2010 and 2014, the number of MIPN increased by 98 %, and the proportion of laparoscopic approaches over the total number of PN rose from 32.5 to 45.7 % (Fig. 1) (data from ATIH for the French Association of Urology (AFU)-ONDU).

These elements all put together; smaller specimens, less invasive surgeries, and diffusion of the technique among the urological community led to a significant reduction in postoperative complications with Larcher et al. [4], reporting a benefit of MIPN over open PN (OR 0.77 95 % CI (0,61–0,97); $p = 0.003$). Choi et al. reported from a pooled analysis of several series of pure and robot-assisted laparoscopic PN published between 2009 and 2013, low rates of conversion to open surgery (3.6 %), and conversion to radical nephrectomy (5.3 %). The mean peri-operative complication rates for Clavien grades 1–2 and 3–5 were 20 and 6.5 %, respectively [5].

Moreover, the 30-day hospital readmission rate after robotic PN was recently evaluated in two publications analyzing data from the Cleveland Clinic and from a US national registry. Both of them reported a low rate of 4.5 % [6, 7]. Remarkably, Autorino et al. [7] reported, in multivariable analysis, an advantage of robotic PN over open PN regarding the risk of 30-day readmission (OR 0.684 95 % CI (0.509–0.920); $p = 0.012$).

✉ Jean-Christophe Bernhard
jcb31000@hotmail.com

1 Department of Urology and Kidney Transplant, CHU Bordeaux, University of Bordeaux, Place Amélie Raba Léon, 33076 Bordeaux, France

2 French Research Network on Kidney Cancer UroCCR, Bordeaux, France

3 Anesthesiology Department, CHU Bordeaux, University of Bordeaux, Bordeaux, France

4 Radiology Department, CHU Bordeaux, University of Bordeaux, Bordeaux, France

5 Medical Oncology Department, CHU Bordeaux, University of Bordeaux, Bordeaux, France

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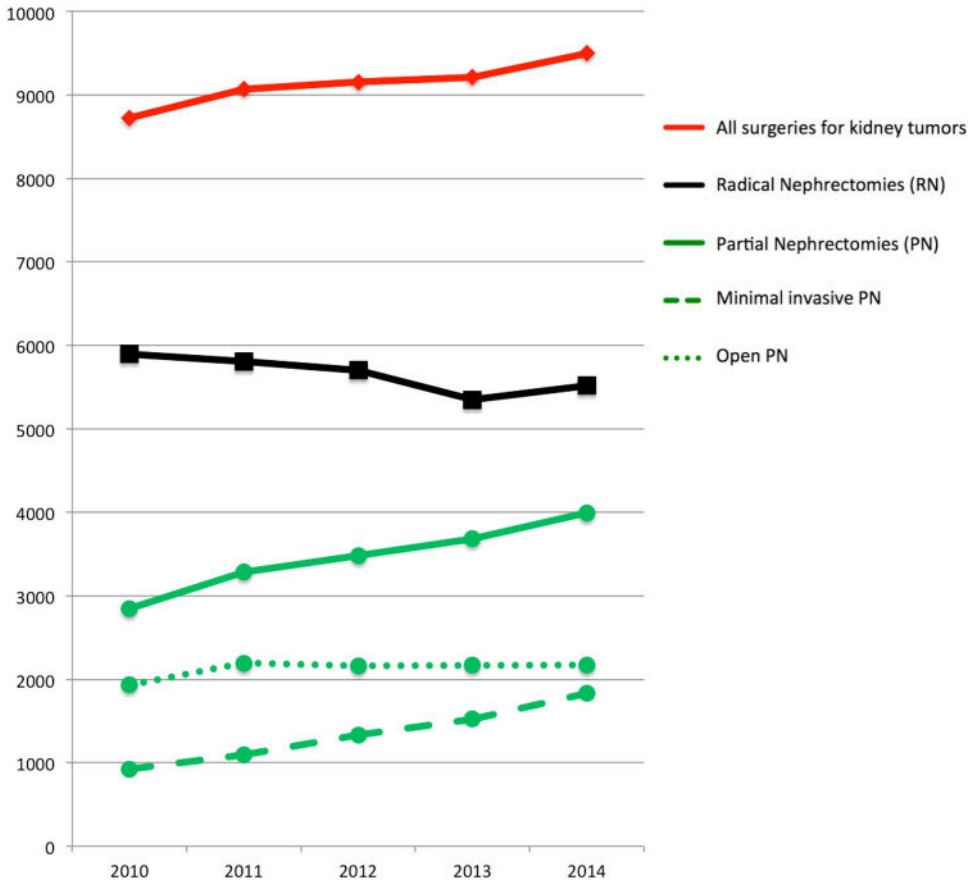

Fig. 1 Trends on kidney tumor surgery in France between 2010 and 2014 (data from ATIH for the French Association of Urology (AFU)-ONDU)

On a medico-economic point of view, the reported decrease in the risk of postoperative complications resulting from minimal invasive approaches, together with substantial cost savings thanks to fast-track or day-case strategies, could certainly help offsetting the extra-cost of robotic assistance.

As it was done for laparoscopic nephroureterectomy, some teams then reported specific clinical pathways for enhanced recovery and reduced length of hospital stay [8–10]. In conjunction with NSS technique evolution in the attempt to simplify the procedure, improve functional outcome and decrease postoperative pain, discharging patients on postoperative day (POD) 1 appears to be safe and feasible [11–13]. Abaza and Shah [9] reported in this setting that discharge on POD 1 was possible for 97 % of the patient with a 30-day postoperative readmission rate of 2.7 %.

Although available data in the international literature on ambulatory nephrectomy are restricted to laparoscopic radical nephrectomy and only limited to 18 cases, of whom no more than seven for tumors, we can certainly question, if discharge on POD-1 or POD-0 after PN makes a big difference [14, 15]?

This is the precise question we raised at our institution. Over the past 5 years, the proportion of minimal invasive PN among the total number of kidney tumor surgeries rose from 9.2 to 55 %. In the same time, the mean length of hospital stay for minimal invasive PN decreased by 40 % and the mean postoperative day of patient discharge fell from 7.9 in 2010 to 4.3 in 2014. Till the beginning of 2015, a specific clinical pathway for kidney cancer conservative strategies, including ablative treatments, was set up and deployed at our center, resulting in most patients being discharged at POD 1 or 2.

The next step was to demonstrate the feasibility of patients being discharged home on the same day than surgery, what was achieved in October 2015. To our knowledge, we report here, the first case of robot-assisted partial nephrectomy to be discharged at postoperative day 0. It was the case of a 27-year-old male, without any comorbidity, both normal renal function and contralateral kidney, diagnosed with a low complexity 1.6 cm tumor (RENAL 5a and PADUA 7a). The case was managed with an off-clamp transperitoneal robot-assisted elective PN (Fig. 2). Operative and console times were 81 and 52 min, respectively. Blood loss was 10 mL. The patient ambulated and had oral diet at 2:30 p.m. and was successfully discharged home with family at 7 p.m.

The patient was called on POD-1 and 4 to assess the postoperative course and check the efficacy of the oral analgesia. No complication happened, and the maximal

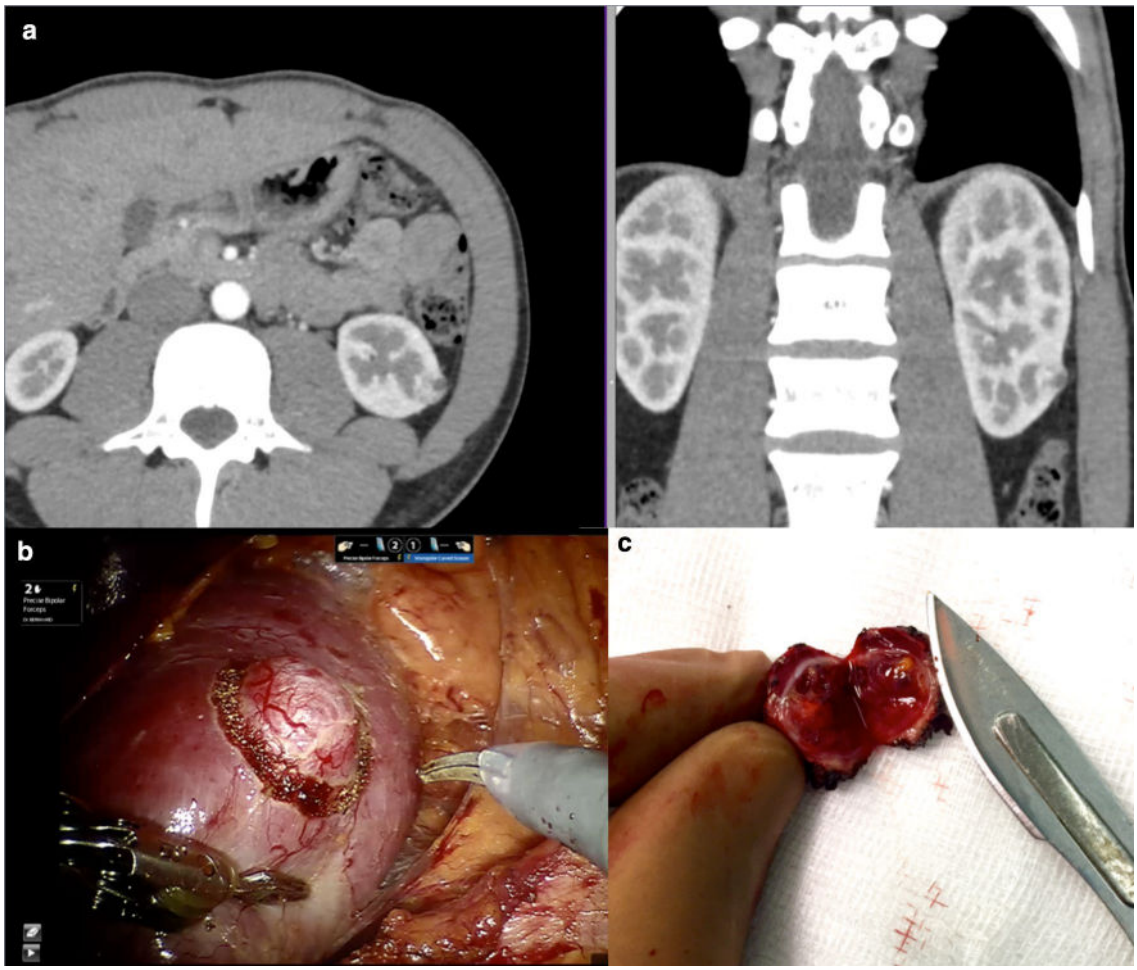

Fig. 2 Case presentation. **a** Arterial phase of the CT scan (axial and coronal views) showing the low complexity 1.6-cm-wide tumor. **b** intraoperative view **c** Specimen

pain intensity reported with analog scale was 2 over 10 without morphine-derived pain killer usage.

The pathology confirmed that it was a Fuhrman grade 2 clear cell renal cell carcinoma with negative margins. Investigations for genetic susceptibility were subsequently launched.

In our experience, a simple case was initially elected on purpose. To fulfill all conditions for the higher chance of success implied careful review of patient and tumor characteristics. Indeed, the most important challenge will lie in the adequate selection of good candidates for day-case PN. Not only based on patient comorbidities (Charlson and ASA scores), the prediction of case complexity through nephrometry scores such as RENAL and PADUA may help providing a reliable estimate of operative duration and risk of complications [16, 17].

Rambachan et al. reported in 2014 some predictors of readmission following outpatient urological surgery. Although no kidney surgery cases were included, it is noteworthy that cancer history (OR 3.48), bleeding disorder (OR 2.03), male gender (OR 1.38), ASA level 3 or 4 (OR 1.34), and age (OR 1.01) were significant predictors of readmission. Readmitted patients also had a higher 30-day complication rate [18]. Autorino et al. [7] reported on a series of 5276 RN and PN that independent risk factors for unplanned readmission comprised minimal invasive approach for PN (OR 0.684), history of diabetes (OR 1.657), use of steroids (OR 2.132), bleeding disorders (OR 1.837), postoperative surgical site infection (OR 4.705), postoperative urinary tract infection (OR 5.566), and postoperative transfusion (OR 2.129).

More specifically, regarding robotic PN, Brandao et al. [6] reported that a Comorbidity Charlson Index of 5 or greater increased by 2.7 times the risk of hospital readmission. Outpatient PN will obviously not be suitable for all patients, and careful selection will be mandatory. Both specific baseline patient's factors and postoperative events will certainly have to be recognized for the first ones and

prevented for the second ones in the attempt to develop day-case PN.

A high activity volume and a multidisciplinary team involvement with Enhanced Recovery after Surgery (ERAS) program taking into account the different parameters influencing patient recovery along the three periods of the clinical pathway (pre-, peri- and postoperative) may for sure be recommended [19]. In this setting, patient education may play a crucial role. Indeed, the first step is to manage expectations by educating patients and their families. Every mean providing patient with a better understanding of their disease and comprehension of the treatment strategy may certainly help patient compliance and success of fast-track and outpatient PN [20].

Finally, the relevance of outpatient partial nephrectomy will have to be strictly assessed. This evaluation will necessarily encompass the following aspects:

- Quality of care and recovery as well as patient satisfaction assessment thanks to validated questionnaires [21–23].
- Safety with good-quality reporting and grading of the complications including morbidity, mortality, and readmission rate [24].
- Cost efficiency while keeping in mind that the best way to reduce cost is to avoid complications [10, 25].
- Reproducibility.

Prospective comparative studies are needed to validate day-case PN.

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Compliance with ethical standards

Conflict of interest The authors declare that they have no conflicts of interests.

Ethical standard The clinical data reported were collected within the framework of the UroCCR project that is IRB-approved and obtained the CNIL authorization number DR-2013-206. All patients receive oral information about the objectives and methodology of the UroCCR project, and informed written consent is obtained from all participants before inclusion.

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