Oncologic Outcomes of Kidney Sparing Surgery versus Radical Nephroureterectomy for the Elective Treatment of Clinically Organ Confined Upper Tract Urothelial Carcinoma of the Distal Ureter

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Abbreviations and Acronyms

CIS = carcinoma in situ
CSS = cancer specific survival
DU = distal ureterectomy
ENDO = endoscopic surgery
IVRFS = intravesical recurrence-free survival
KSS = kidney sparing surgery
LRFS = local recurrence-free survival
LVI = lymphovascular invasion
OS = overall survival
RNU = radical nephroureterectomy
UTUC = upper tract urothelial carcinoma

Purpose: We compared the oncologic outcomes of radical nephroureterectomy, distal ureterectomy and endoscopic surgery for elective treatment of clinically organ confined upper tract urothelial carcinoma of the distal ureter.

Materials and Methods: From a multi-institutional collaborative database we identified 304 patients with unifocal, clinically organ confined urothelial carcinoma of the distal ureter and bilateral functional kidneys. Rates of overall, cancer specific, local recurrence-free and intravesical recurrence-free survival according to surgery type were compared using Kaplan-Meier statistics. Univariable and multivariable Cox regression analyses were performed to assess the adjusted outcomes of radical nephroureterectomy, distal ureterectomy and endoscopic surgery.

Results: Overall 128 (42.1%), 134 (44.1%) and 42 patients (13.8%) were treated with radical nephroureterectomy, distal ureterectomy and endoscopic surgery, respectively. Although rates of overall, cancer specific and intravesical recurrence-free survival were equivalent among the 3 surgical procedures, 5-year local recurrence-free survival was lower for endoscopic surgery (35.7%)

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than for nephroureterectomy (95.0%, p <0.001) or ureterectomy (85.5%, p = 0.01) with no significant difference between nephroureterectomy and distal ureterectomy. On multivariable analyses only endoscopic surgery was an independent predictor of decreased local recurrence-free survival compared to nephroureterectomy (HR 1.27, p = 0.001) or distal ureterectomy (HR 1.14, p = 0.01). Distal ureterectomy and endoscopic surgery did not significantly correlate to cancer specific or intravesical recurrence-free survival. However, when adjustment was made for ASA® (American Society of Anesthesiologists®) score, distal ureterectomy (HR 0.80, p = 0.01) and endoscopic surgery (HR 0.84, p = 0.02) were independent predictors of increased overall survival, although no significant difference was found between them.

Conclusions: Because of better oncologic outcomes, distal ureterectomy could be considered the elective first line treatment of clinically organ confined urothelial carcinoma of the distal ureter.

Key Words: ureter, kidney, urothelium, carcinoma, mortality

Upper tract urothelial carcinoma is uncommon and accounts for only 5% to 10% of all urothelial malignancies.[1] Although RNU with bladder cuff excision remains the standard of care for treating UTUC, KSS can be considered in select patients diagnosed with low risk tumors to reduce the potential cardiovascular morbidity commonly related to nephron loss.[2] Indeed renal unit removal has been previously demonstrated to induce chronic kidney disease, which is largely associated with an increased risk of noncancer specific death.[3,4]

Because of the improved ability to assess disease risk in a preoperative setting and technical advances in the surgical armamentarium, there is growing interest in conservative management of UTUC.[5] Specifically DU and ENDO have been proposed as alternatives to RNU with bladder cuff excision to electively treat clinically organ confined UTUC of the distal ureter.[1] However despite the legitimacy of KSS to manage imperative cases of UTUC, its effectiveness in terms of oncologic control remains to be proven when used for elective indications.[6] Indeed sparse evidence-based data are available to guide clinical decision making for such selected cases of UTUC, especially with a distal ureteral location, which are particularly convenient for performing conservative procedures due to the proximity with the bladder.[7–9] Thus, we compared oncologic outcomes obtained after RNU vs DU or ENDO as elective treatment for clinically organ confined UTUC of the distal ureter.

MATERIALS AND METHODS

Population

From a multi-institutional collaborative database that included 1,266 patients and received approval from the local hospital ethics committee at 34 participating European centers we identified 412 patients diagnosed with unifocal UTUC of the distal ureter who were treated with RNU, DU or ENDO between 2004 and 2013. Preoperative stratification of these tumors, which were located below the level of the iliac vessels, was established using computerized tomography urography and/or magnetic resonance imaging. However, ureteroscopy with a biopsy was not systematically performed because of the lack of consensus regarding such a diagnostic approach during the inclusion period.

Patients diagnosed with previous or concomitant bladder cancer, clinically nonorgan confined disease (cT3 or greater), evidence of primary nodal involvement (cN+) or distant metastatic disease (cM+) and those treated with perioperative chemotherapy were excluded from study. To consider elective cases only the presence of a solitary kidney, chronic kidney disease (glomerular filtration rate less than 60 ml/minute/1.73 m^2) and bilateral UTUC were also exclusion criteria. Consequently complete data on age, gender, ASA score, smoking status, preoperative urinary cytology, pT stage, pathological tumor grade, LVI and concomitant CIS were available on 304 patients who met study inclusion criteria.

The study population was then divided into 3 groups according to the surgical procedure used to treat UTUC of the distal ureter. Although indications for RNU or KSS were mainly based on surgeon discretion and patient informed consent, only patients with negative or low grade preoperative urinary cytology results were considered for ENDO.

Surgical Procedures

Briefly RNU was performed using an open or a laparoscopic approach. Open iliac access through a Gibson incision was systematically used to perform DU. During these surgical procedures the distal ureter was meticulously dissected to avoid any direct contact with the tumor and the bladder cuff was distally obtained by removing 1 cm of bladder mucosa circumferentially around the ureteral orifice. Because of the absence of locally advanced features on the preoperative workup, no patient underwent concomitant lymph node dissection. Specifically ureteroneocystostomy at DU was performed directly when a short segment of juxtavesical ureter was removed, or using a bladder psoas muscle hitch to allow for a tension-free anastomosis when a greater gap had to be bridged. Regarding ENDO, ureteroscopic ablation of the tumor was performed using laser technology after a cold-cup forceps biopsy or large intraluminal debulking.