

Application of water jet technology and argon plasma coagulation in nephron-sparing surgery for a kidney tumour — a case report

Zastosowanie technologii water jet i koagulacji plazmą argonową w chirurgii organooszczędzającej guza nerki — opis przypadku

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Streszczenie

Wstęp: Rosnąca dostępność badań obrazowych skutkuje rosnącym wskaźnikiem wykrywania guzów nerki. Są to zwykle małe guzy nerek we wczesnych stadiach zaawansowania. Chirurgia oszczędzająca nerki jest złotym standardem w leczeniu tych zmian.

Opis przypadku: Guz prawej nerki T1aN0M0 o średnicy 2 cm u 60-letniej pacjentki został przypadkowo stwierdzony w tomografii komputerowej jamy brzusznej i miednicy z kontrastem, przeprowadzonej w ramach obserwacji po ekstirpacji macicy z przydatkami z powodu raka endometrium. U pacjentki dodatkowo zdiagnozowano torbiele korowe i okołomiedniczkowe nerki lewej, które uznano za dodatkowy potencjalny czynnik mogący wpływać na pooperacyjną czynność nerek. Zmianę uznano za kwalifikującą się do operacji nerkooszczędzającej.

Wnioski: Wysoka selektywność tkankowa podczas preparowania tkanek przy użyciu technologii water jet, minimalne zwęglenie tkanek w wyniku koagulacji argonem oraz decyzja o niestosowaniu urazowych szwów mięszzowych może przyczynić się do jak najmniejszego zmniejszenia funkcji filtracyjnej nerek w okresie pooperacyjnym.

Słowa kluczowe: operacja organooszczędzająca nerki, guz nerki, koagulacja plazmą argonową, water jet

Abstract

Background: Increasing availability of medical imaging results in a growing detection rate of kidney tumours. They are usually small renal masses at early stages of advancement. Nephron-sparing surgery is the gold standard in the treatment of these tumours.

Case Report: A T1aN0M0 right kidney tumour measuring 2 cm in diameter was incidentally found in a 60-year-old patient in contrast-enhanced computed tomography of the abdomen and pelvis, conducted as follow-up after extirpation of the uterus with the adnexa due to endometrial cancer. The patient was additionally diagnosed with cortical and parapelvic cysts of the left kidney, which were considered an additional potential factor that could affect postoperative kidney function. The patient was deemed eligible for nephron-sparing surgery.

Conclusions: High-grade tissue selectivity during tissue preparation and dissection with a water jet tool, minimal tissue carbonisation owing to argon plasma coagulation and a decision not to use traumatising parenchymal sutures could have contributed to positive postoperative renal filtration function.

Key words: nephron-sparing surgery, kidney tumour, argon plasma coagulation, water jet

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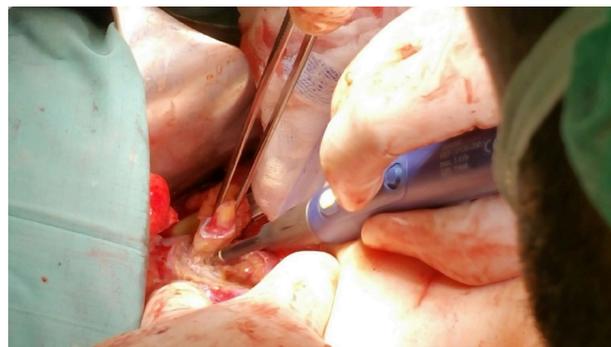
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Background

Owing to the ever increasing role of medical imaging (e.g. ultrasonography, computed tomography or magnetic resonance imaging), the number of incidentally detected kidney tumours is growing as well. These tumours are usually small renal masses (SRMs) at early advancement stages [1]. According to the guidelines of the European Society of Urology, kidney tumours at early stages (T1) should be treated with nephron-sparing surgery (NSS). In the long term, this type of treatment allows renal function preservation, decreases overall mortality and reduces the incidence of cardiovascular events [2]. The main goals of NSS are tumour removal with negative surgical margins and preservation of the best possible function of the remaining renal parenchyma with minimised risk of adverse events. The progress of medical technologies renders surgical procedures more and more effective.

Case Report

A T1aN0M0 right kidney tumour measuring 2 cm in diameter was incidentally found in a 60-year-old patient (M. M.) in contrast-enhanced computed tomography of the abdomen and pelvis, conducted as follow-up after extirpation of the uterus with the adnexa due to endometrial cancer. Of the patient's chronic conditions, the following are noteworthy: hypertension, ankylosing spondylitis and hypothyroidism. Moreover, the patient was additionally diagnosed with cortical and parapelvic cysts of the left kidney, which were considered an additional factor that could affect postoperative kidney function. The preoperative creatinine level was 1.4 mg/dL. The patient was deemed eligible for surgery with an intention to conduct a nephron-sparing procedure. The kidney tumour (Fig. 1) was excised using a water jet (Fig. 2, 3, 4), and tumour bed haemostasis was achieved with argon plasma coagulation (Fig. 5).



Ryc. 2. Kidney tumour resection with a water jet



Ryc. 3. Kidney tumour resection with a water jet



Ryc. 1. Uncovered tumour of the right kidney

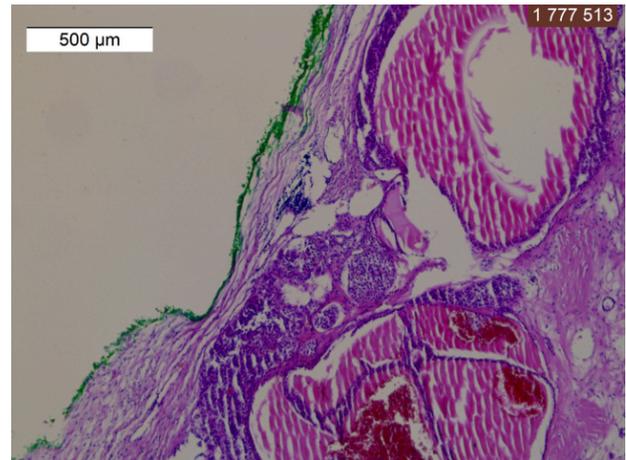


Ryc. 4. Kidney tumour resection with a water jet

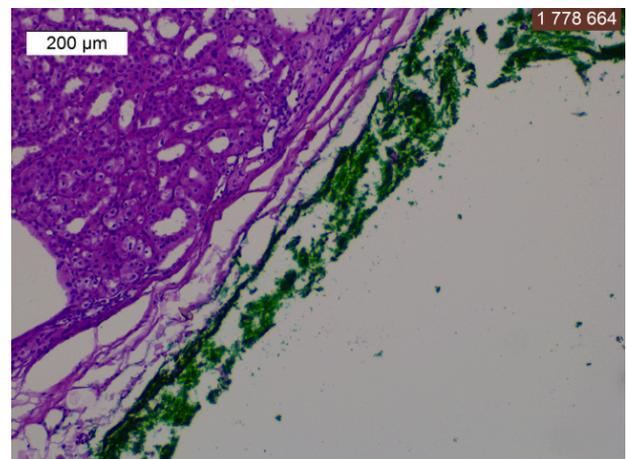


Ryc. 5. Tumour bed haemostasis using argon

The procedure lasted 115 minutes, with warm ischaemia time of 10 minutes. Intraoperative loss of 250 mL of blood and 120 mL diuresis was noted. On the day 0 and 1 after surgery, diuresis amounted to 1,000 mL and 2,000 mL, respectively. Postoperative biochemical tests showed no glomerular filtration rate decline (creatinine on day 0, 1 and 30 after surgery was 1.4, 1.2 and 1.4 mg/dL, respectively). The postoperative period was uneventful. Throughout the entire postoperative period, the patient-reported pain score was 1/10 in the NPRS system. The patient was discharged in an overall good state on day 5 after the surgery. In a histopathology report, the excised lesion was referred to as oncocytoma with negative surgical margins (diagnosis No 1778663) (Fig. 6, 7).



Ryc. 6. Negative surgical margins



Ryc. 7. Negative surgical margins

Discussion

Treatment outcomes achieved with various tools need to be analysed statistically.

Conclusions

High-grade tissue selectivity during tissue preparation and dissection with a water jet tool [3], minimal tissue carbonisation owing to argon plasma coagulation [4] and a decision not to use traumatising parenchymal sutures may have contributed to positive postoperative renal filtration function. Treatment outcomes achieved with various tools need to be analysed statistically.

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