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HARMONIC FOCUS SCALPEL FOR TREATMENT OF WILMS' TUMOR IN CHILD

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ПРИМЕНЕНИЕ НАСАДКИ FOCUS ДЛЯ УЛЬТРАЗВУКОВОГО СКАЛЬПЕЛЯ В ЛЕЧЕНИИ РЕБЕНКА С ОПУХОЛЬЮ ВИЛЬМСА

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Case report of 1-year patient with damaging of Wilms' tumor (Stage IV). According to the current staging and treatment SIOP 9 protocol, patient received the preoperative chemotherapy. Harmonic Focus Scalpel provided reliable and safe option for Wilms' tumor resection in the child, lesser operative time and good postoperative recovery.

Key words: Wilms' tumor, treatment, Harmonic Focus Scalpel

Клинический случай лечения однолетнего ребенка с повреждением опухоли Вильмса (стадия IV). На фоне проведения предоперационной химиотерапии по протоколу SIOP-9 у пациента отмечались признаки разрыва опухоли. Использование насадки Фокус для ультразвукового скальпеля Гармоник обеспечило надежное и безопасное удаление опухоли Вильмса, а также сократило длительность оперативного пособия с хорошим отдаленным результатом лечения.

Ключевые слова: опухоль Вильмса, лечение, насадка Focus, ультразвуковой скальпель

Wilms' tumor (WT), or Nephroblastoma, is a solid tumor in children, with an estimated incidence of about 0.8–1.0 per 100 000 children per year. It develops from embryonic nephrogenic tissue [1, 2]. Nephrectomy, being the main part in the treatment of WT, is not always feasible in cases of advanced tumors presenting with massive size, involvement of vital structures, including inferior vena cava. Improving of the prognosis in advanced stage nephroblastoma requires new surgical techniques, and treatment options [3]. The purpose of our study was to verify the efficacy and applicability of the Harmonic Scalpel with Focus shears in WT surgery.

Case report: A 1-year and 8-month-old male patient was admitted to our department with palpable, smooth abdominal mass accompanied with pain in the right flank. Weight loss and fatigue were also observed. Cardiovascular and neurological findings showed no abnormalities. Routine laboratory work-up including a full blood count, urine analysis, chest X-ray, and renal function tests were normal.

Abdomen ultrasonography revealed heterogeneous mass in the right kidney measuring 92×90×87 mm, with volume of 720 cm³. No calcified areas were noted, and the renal pelvis was not involved. Other organs have presented with normal sonographic profile. No lymph nodes

enlargement was found. A provisional diagnosis of WT thus was made.

CT confirmed the above findings and raised no suspicion regarding lymph nodes involvement, but vena cava and right side of the liver involvement was found. A solitary lung metastasis was revealed on chest CT scan.

According to the current staging and treatment SIOF 9 protocol, patient received the preoperative chemotherapy. Unfortunately, after the second course we have noted the progression of tumor and a signs of damaging of kidney tumor. Thus, on urgent basis the patient has undergone surgery on the 7th day after chemotherapy initiation. By the time of the surgery patient was presenting with pancytopenia (hemoglobin – 8.2 g/dL, white blood cells – $1.0 \times 10^9/L$, platelets at $100 \times 10^9/L$).

The surgery has confirmed abdominal CT scan findings, and a right-sided total nephrectomy was performed. Examination of the left kidney showed no focal lesions.

The renal vein and inferior vena cava were manually examined for thrombosis with no intravascular thrombi found.

The large tumor displaced inferior vena cava and the aorta, so our first opinion had been that the tumor was located behind the inferior vena cava. Further separation of intimate connection of the tumor and vena cava with Harmonic Focus curved was performed without injuring the vessel.

Meticulous dissection and exhaustive hemostasis are keys to ensure a dry operating field and to avoid inadvertent damage to the adjacent structures. At the same time the use of electrosurgical coagulation for bleeding control bears potential risk of injuring major veins and surrounding structures. Thus, we used HS (Focus shears) for separation of tumor from vessels (renal vein and inferior vena cava), and the instrument has shown to be as useful for dissection of tissue planes as finger dissection.

The kidney was mobilized from the retroperitoneal space (Figure). As Focus shears offer simultaneous cutting and coagulation with minimal lateral thermal spread we were able to divide tumor adhesions with surrounding organs (liver and adrenal gland). The operative blood loss comprised 150 ml. No intra- and postoperative complications were registered.

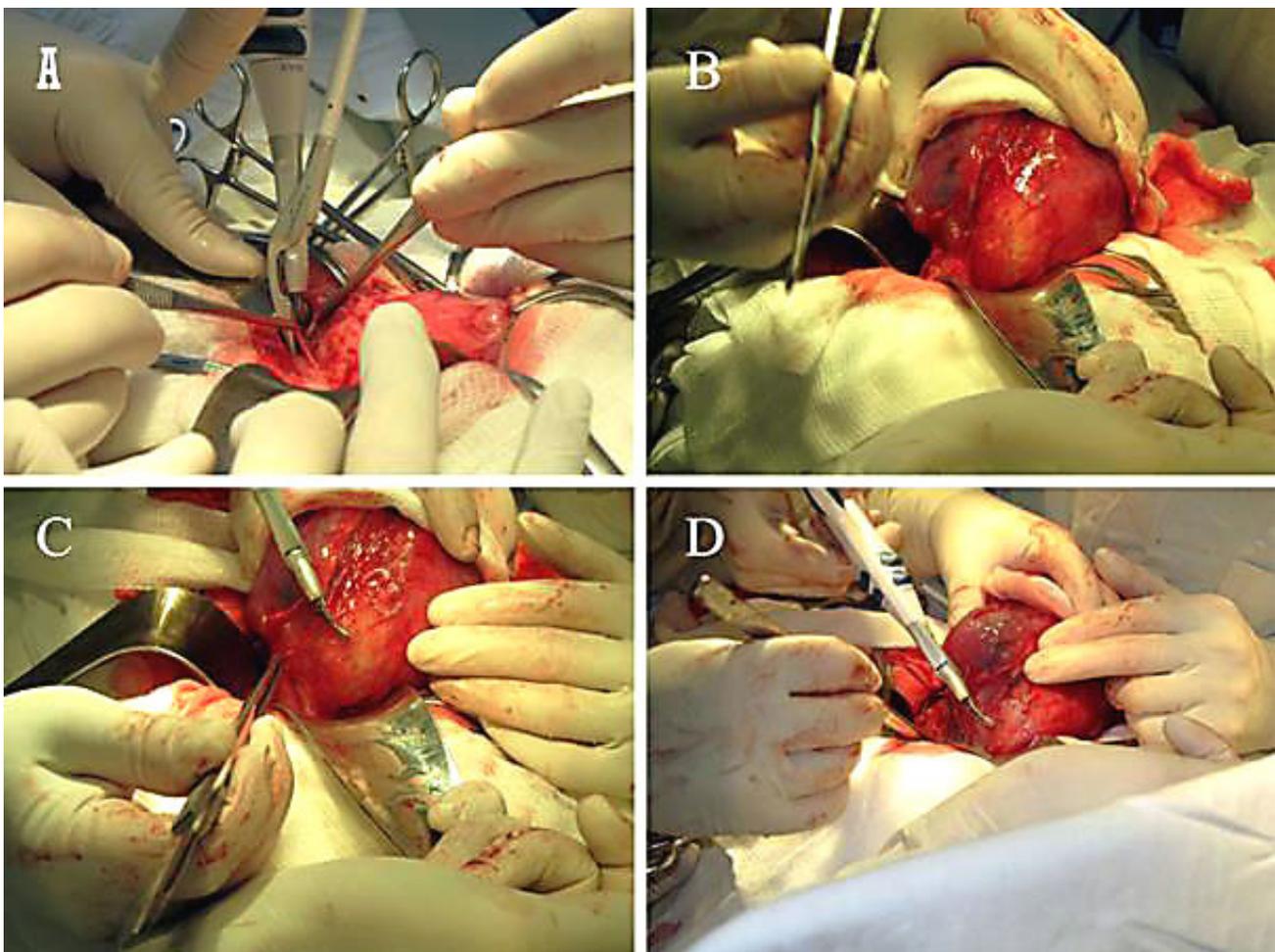


Fig. Surgery of Wilms' tumor. Retroperitoneal space is opened by incision lateral to the reflection of the peritoneum of the ascending colon. Meticulous dissection and exhaustive hemostasis are important to ensure dry operating field and to avoid inadvertent damage to the adjacent structures (A). The kidney is partly mobilized from the retroperitoneal space (B). As Focus shears offer simultaneous cutting and coagulation, along with minimal lateral thermal spread we have been able to divide tumor from adhesions with adrenal gland (C). Ultrasonic shears have been used for the dissection, division and coagulation of vessels and tissue (D)

The histopathology has revealed the following features: blastemal – epithelial type of Nephroblastoma. The presence of multiloculated cysts separated by thin fibrous septa and lined by hobnail epithelium.

Foci of necrosis and single-cell necrosis were also found in the solid tumor area. Immunohistochemical studies with CD99, p53, S100, CD56, Desmin were negative.

The surgery of lung metastasis was performed via thoracoscopic access without any technical issues. Histopathology (D 5035/3) has shown the blastemal – epithelial type of Nephroblastoma.

The postoperative chemotherapy regimen consisted of a combination of Epirubicin, Ifosfamide, Etoposide and Carboplatin [4]. Also child had the Radiotherapy (place of removed tumor and chest).

The patient currently reached the complete recovery with 2 years follow-up.

Discussion. Transperitoneal radical nephrectomy is the main part in the treatment of WT, some advanced tumors could not be resected because of massive size, involvement of vital structures (liver, adrenal gland), and inferior vena cava invasion. In our study we have used Harmonic Focus curved shears (the part of the Harmonic family of advanced ultrasonic surgical devices) to

improve prognosis in patient presenting with these problems [5, 6].

Also in our case study Harmonic Focus curved shears has accounted for minimized intraoperative blood loss (150 ml vs. 300–500 ml with conventional techniques according to our experience), minimized coagulation necrosis and absence of febrile reactions postoperatively, as well as reliable hemostasis, which allowed us to avoid postoperative retroperitoneal space drainage.

Conclusions. The Harmonic Focus Scalpel promises to be a reliable and safe option for Wilms' tumor resection in the child, lesser operative time and good postoperative recovery. Minimal lateral thermal footprint along with possibility to use it as both hemostatic and dissection tool, allows to consider this device as one of the most suitable instruments in pediatric surgery.

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MODERN SURGICAL STRATEGIES IN PEDIATRIC ONCOLOGY

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СОВРЕМЕННЫЕ ХИРУРГИЧЕСКИЕ СТРАТЕГИИ В ДЕТСКОЙ ОНКОЛОГИИ

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In review showed modern surgical strategies in selected areas of pediatric oncology. The newer energy sources have contributed to less blood and thus fewer complications following major resections. Robotic, endoscopy and stereotactic surgery have been the major advances in the treatment of pediatric tumours. There is more dependence on the use of chemotherapy, newer protocols with less toxic drugs and for shorter duration.

Key words: pediatric oncology, diagnostic, treatment, surgery