Laparoscopic Nephrectomy for Wilms Tumor

C. Andolfi B. Randi G. Ruggeri M. Lima

ABSTRACT

Wilms tumor is the most frequent primary renal malignancy in children. The surgical resection is traditionally performed through laparotomy. The advent of laparoscopic surgery for benign renal lesions has led the surgeon to use a minimal invasive approach for the nephroblastoma. We describe a 9-months-old girl who presented with a left renal mass. A laparoscopic resection of the tumor with left radical nephroureterectomy was performed. The specimens were removed in an endoscopic bag through a low suprapubic incision. The patient had an uncomplicated recovery. Minimally invasive techniques may be considered for resection of nephroblastoma if oncologic principles are carefully followed.

Purpose

Figure 1: RMN of the mass

Wilms tumor is the most frequent primary renal malignancy in children. The surgical resection is traditionally performed through laparotomy. The advent of laparoscopic surgery for benign renal lesions has conducted the surgeon to apply a minimal invasive approach for the nephroblastoma[1]. As described in the literature, there are different benefits in the use of this procedure: visual magnification; efficient and more practical dissection; possibility to visualize and to remove small metastasis, especially into the pelvic cavity; better pain control. However, to date, there have been no accept indications for selection of patients for laparoscopic nephroureterectomy in Wilms tumor and the risks must not be underestimated: limited movements because of the reduced space; tumor breakage; absence of tactile perception (the dissection is performed only by visual information); possibility of metastasis at the points of insertions of the trocars. Recommendations in the execution of such procedure are: the safe fixation of the trocars; the imperative use of the endo-bag; to don’t spare on
dimensions of the lower suprapubic incision. Absolute contraindications are: thrombosis of the cava vein or of the renal vein; a tumor that overcomes the border of the adjacent vertebral body; infiltration of the adjacent organs.

Methods

We report the case of a 9 month-old baby with the casual finding of a 3.5 cm renal tumor at the ultrasounds; the mass was found in the inferior pole of the left kidney. The traditional method of surgical resection includes a transperitoneal approach using a subcostal or transverse upper abdominal incision. Retroperitoneal lymph nodes are routinely sampled given their significant contribution to surgical staging. Recently, selected case reports have demonstrated the safety and feasibility of a laparoscopic approach to Wilms tumor[2-4]. In our case the RMN showed a favorable anatomical situation (Fig. 1, 3): contained dimensions, not infiltrating, not overcoming the border of the adjacent vertebral body. Insofar we decided to attack the tumor with a minimal invasive approach. The patient was positioned at 60 degrees lateral decubitus with the interest side up. The first port was a 10 mm – port for telescope, set by a trans-umbilical approach with an open technique. The abdominal insufflation with CO2 was 10 mm Hg. Three other 5 mm – ports were placed under laparoscopic vision in the epigastrium, left iliac fossa and left lumbar region on the anterior axillary’s line (Fig. 2)[5].

The procedure started by complete inspection of the abdominal cavity. The nephrectomy was initiated by opening the peritoneum on the outside of the colon and releasing it to expose the retroperitoneal structures (Fig. 3, 4). The anterior surface of the aorta and vena cava was cleared of overlying lymphatic and adventitial tissue up to the level of the renal vein.
The involved renal artery and vein were coagulated only with Ligasure (Fig. 5), and the surrounding soft tissue attachments of the kidney were divided. The ureter was isolated down to the level of the bladder and sectioned (Fig. 6).

Figure 5: coagulation of left renal artery and vein with Ligasure

The perirenal fat was removed, and the periaortic lymph nodes were included. Adequate sampling of regional lymph nodes and hilar nodes was obtained, with no neoplastic cell spillage. The tumor was placed in a bag and was extracted intact, without morcellation, through a low suprapubic incision, large enough to avoid a tumoral rupture (Fig. 7, 8).

Figure 6: left ureter dissection

Figure 7: tumor extraction by the low suprapubic incision

Results

The histological study has confirmed that the tumor was limited to the kidney and it was completely excised; the surface of the renal capsule was intact; the mass was not ruptured; there was no involvement of extra-renal or renal sinus lymph-vascular spaces; no residual
tumor apparent beyond the margins of excision; no metastasis of tumor to lymph nodes were identified. The situation was compatible with a Stage I Wilms tumor.

Conclusions

The use of minimally invasive surgery in the treatment of Wilms tumor should be founded on accepted oncologic principles. Laparoscopic nephrectomy should effectively accomplish all of the steps achieved by an open approach. From a technical standpoint, a nephrectomy can be achieved laparoscopically with minimal complications to surrounding structures. In using such techniques, our case demonstrates that a minimally invasive approach can be applied to the treatment of Wilms tumor, but it must guarantee the same surgical quality of the traditional surgery. The operation must allow for an adequate oncologic procedure: the operation must minimize the risk of tumor rupture, allow adequate visualization of tumor and metastases to maximize the reduction of tumor burden, and provide a means to further stage the disease. Our case demonstrates that a laparoscopic approach can meet all of these requirements. Insofar, in the moment, we consider it limited to well selected cases, in which the following characteristics are satisfied: tumor of contained dimensions, intact renal capsule, not infiltrating and that it doesn’t overcome the border of the adjacent vertebral body. Anyway rigorous and multi-institutional studies are required on the safety and long-term outcomes of laparoscopic nephroureterectomy for Wilms tumor, to best determine the appropriate indications for this operation and to compare the results between the two procedures.

References


