Laparoscopic nephrectomy in treatment of renal tumor at Thanh Hoa General Hospital

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Abstract. Objectives of the paper were to evaluate the results and to provide some remarks on laparoscopic nephrectomy in the treatment of renal tumors in a provincial hospital. Subjects and methods: 30 patients were diagnosed with renal tumors and underwent laparoscopic nephrectomy at the Department of Urology of Thanh Hoa General Hospital. After that their results were retrospectively analyzed.The mean age was 53.23 years, the rate of incidental detection of tumors 26,67%. Average tumor size 5.33cm. Angiomyolipoma 23.33%, renal cell carcinoma (RCC) 76.67%. The transperitoneal approach 43.33%. Patients have 1 renal artery and 1 renal vein 70%. The mean operative time 116 minutes, the average blood loss 161 ml, the drainage time 5 days and the hospital stay was 6 days. Operative complications: minor haemorrhage 6.67%; major haemorrhage 3.33%. Postoperative complications: 10%. Conversion to open surgery 3.33%. Examined after 6 months for 18 patients (60%), 1 case had livermetastases.Laparoscopic nephrectomy in the treatment of renal tumors is a safe, effective method and can be done in provincial hospitals. However, in order to make a more accurate conclusion, there is a need for large studies with far enough follow-up time. Laparoscopic nephrectomy is a challenging procedure. But with the help experienced physician with good skills it may be done successfully. In the last 30 years' laparoscopic renal surgeryhasmade a great development in technology. With the help of robotic instruments, it is becoming less invasive, and the outcomes are becoming more positive. With recognition of these facts the amount of laparoscopic surgery. is sharply increasingnowadays.

Key words: renal function; laparoscopic surgery; renal tumor; radical nephrectomy; partial nephrectomy.

INTRODUCTION

Kidney cancer accounts for 85% - 90% of kidney tumors and about 2% - 3% of adult cancers. Thanks to the development of modern imaging devices such as ultrasound, CT, MRI, today the rate of accidental detection of early-stage kidney tumors is on the rise, which is in Vietnam. From 14% - 25%, and in America from 48% - 66% (Gill et al., 2010; Krabbeet al., 2014; VũNguyễnKhải Ca Và, 2015; Janicic et al., 2016).

Early, localized kidney tumors are often chosen to be treated with partial or radical nephrectomy. Laparoscopic radical nephrectomy (LRN) was first performed in 1992 by Clayman et al. It is a minimally invasive procedure and has the same therapeutic efficacy with open radical nephrectomy (ORN). Radical

endoscopic nephrectomy is currently being performed more and more, and it is estimated that over the past 10 years there have been more than 10,000 cases of radical endoscopic nephrectomy worldwide significantly increased survival after surgery for about 65% of local kidney cancer cases (Ono et al., 2005; Vũ Lê Chuyên, 2007;Krabbeet al., 2014; Liu et al., 2017).

Data from several studies claim that LrRN showed less analgesia requirement, shorter convalescence time, and less blood loss intraoperatively, while operative time and postoperative complication were thesame.

Laparoscopic surgical approaches to the kidney during PN presently include transperitoneal, retroperitoneal, hand-assisted, robotic, laparoendoscopic single-site surgery (LESS), and natural orifice transluminal endoscopic surgery (NOTES). With each approach, a pneumoperitoneum is created to increase the intra-abdominal working space (Yang et al. 2019).

In Vietnam, kidney laparoscopic surgery was applied from 2002 to 2003 at Viet Duc Hospital, Ho Chi Minh City Medical University Hospital, Binh Dan Hospital. So far, this surgery has been applied in many health facilities at the central level. At provincial health facilities, this procedure is only available in a few places. Thanh Hoa General Hospital has been using this surgery since 2014, through the cases that we have done, we conducted this study to evaluate the results and make some comments about laparoscopicsurgery.

MATERIAL AND METHODS

Subject of research

Including 30 patients diagnosed with kidney tumor and underwent laparoscopic surgery at the Department of Urology, Thanh Hoa Provincial General Hospital.

All the participants did agree to take part in this experiment and do not disclaim the results of the study to be shown in the research paper.

All manipulations below were in according to the moral standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1975, as revised in 2000.

Based on the selection designation for nephrectomy, benign neoplasm and malignant neoplasm diagnosed at pT1 and pT2 stage have not spread to theregional lymph nodes and have not spread far. based on the anatomical results after surgery). All cases have normal opposite kidney. Excludes tumors that can cut the kidney part (tumor size $\leq$ 4cm, tumor on the periphery and protruding kidney surface).

Research method

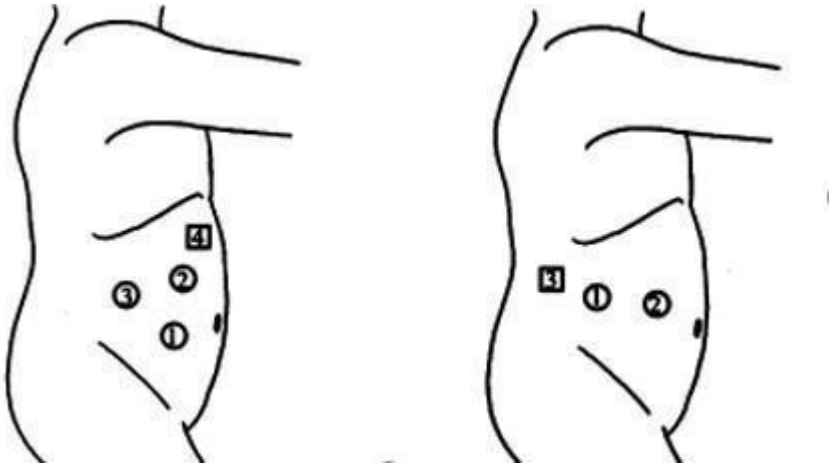
Research using descriptive research and retrospective data. The patients were diagnosed and performed the surgery according to a unified procedure, on the Karl Storz Full HD laparoscope by the same surgical team. Using the Hamonic scalpel Gen 11 ultrasound scalpel from Ethicon Endo-Surgery. Use Hem-o-lock

clips of size 5 and 10mm. Collect data using a general researchsample.

* Patient preparation: All patients underwent endotracheal anesthesia, gastric catheterization, urethral catheterization and intestinal cleansing prior to surgery.

* Surgical procedure: All patients underwent radical nephrectomyby abdominal or posterior peritonealsurgery.

** Peritoneal route: The patient is inclined to the opposite of 700 with lumbar padding. Place the first trocar according to the open method, the rest of the trocar is placed under the observation of the scope, the position of the trocar as shown in Figure 1a. Pump CO2 gas with pressure ≤ 12 mmHg, initial pump speed 2 - 3 l /min.



a b

Through the retroperitoneal abdomen

Figure 1. Enlargement of the trocar through the abdomen and retroperitoneal

For the right side kidney surgery: surgery to lower the angle of the liver and the colon, revealing the front of the right kidney, surgery to continue to the kidney, find arteries and kidney veins to control and clip cut with clip or Hem-o-lock. Liberation around the kidneys. Clamp and cut the ureter in the upper 1/3 section with Hem-o-lock. Collect the whole sample with a plastic bag through the incision in the same pelvic area. Check sectional hemostasis and additional hemostasis. Renal drainage of kidney holes, closing the trocar layer 2 layers.

For left side kidney surgery: similar, but right down the angle of thespleen and lower colon.

** Retroperitoneal line: The patient is inclined to the opposite of 900 with padded waist area Place the first trocar according to the open method, the rest of the trocar is placed under the observation of the looking glass, the position of the trocar is shown in Figure 1b. Pump CO2 gas with pressure ≤ 12 mmHg, initial pump speed 2 - 3 l /min.

For the right kidney surgery: surgery on the kidney stem, revealing the artery and veins of the kidneys to control and clamp with clip or Hem-o-lock. Liberation around the kidneys. Clamp and cut the ureter in the upper 1/3 section with Hem-o-lock. Collect the whole sample with a plastic bag through the same pelvic skin incision. Check sectional hemostasis and additional hemostasis. Renal drainage of

kidney holes, closing the trocar layer 2 layers.

For surgery on the left: similar.

* Care and indicators toconsider:

Patients were monitored for pulse, arterial blood pressure, breathing, temperature and drainage postoperative status. Antibiotics use the β lactamine group in combination with the quinolon group. Reduce non-steroidal and morphine pain. The indicators are recorded: time of surgery, control and clamping technique for vascular cutting, amount of blood loss, number of trocar, time for draining the drain, length of hospital stay, complications - complications. Check back after 3, 6 months (clinical, ultrasound, laboratory).

RESULTS

The characteristics of study's 30 participants are summarized in Table 1.

These are the factors that affected operating time and surgery outcomes the most. There were 16 male and 14 female patients, although sex does not play key role.

Blood loss depends on some factors, such as tumor size, tumor complexity.

These factors also effect operative time.

Patients mainly had typical complaints, which are presented in the table. The prognosis of renal tumor mainly depends on histology.As abdominalimaging is getting more and more popular the amount of small renal has increased in recent decades.

Table 1. Pathological characteristics

Variable	Mean (range) or amount of patient or ratio (%)
Age (years)	53,23 (28 – 80)
Sex (male/female)	16/14
Located side (right/left)	17/13
Size of tumor (cm)	5,33 (4 – 7)
Location of tumor Upper polar Middle part Lower polar	 9 (30%) 14 (46,67%) 7 (23,33%)
Present symtoms* Have symtoms Incidental diagnosis	 22 (73,33%) 8 (26,67%)
Staging ** pT1a pT1b pT2 ≥ pT3	 5 (16,67%) 15 (50%) 3 (10%) 0
Histology Benign Angiolypomioma	 7 (23,33%)

Renal cell carcinoma	
Clear cell	18 (60%)
Papillary	3 (10%)
Chromophobe	2 (6,67%)

* Symptoms include: low back pain, hematuria, lump, fever and weightloss. Cases without symptoms are detected by ultrasound.

** 7 cases of benign tumors is not staging, these cases and pT1a cases without indication of partial nephrectomy because the tumor is located in the middle part of the kidney and deep into the renal parenchyma, adjacent to the system calyx-pyelonephric.

Table 2. Surgical characteristics and results

Variable	Mean (range) or amount of patient or ratio (%)
Approach	
Transperitoneal	13 (43,33%)
Retroperitoneal	17 (56,67%)
Amount of trocars	
3	13 (43,33%)
4	14 (46,67%)
5	3 (10%)
Operative time (minutes)*	116,17 (80 – 255)
Blood vessel of renal hilar	
1 artery and 1 vein	21 (70%)
More than: 1 artery or 1 vein	9 (30%)
Renal vascular control	
Hilar ligating en block **	1 (3,33%)
Vessels ligated separate	29 (96,67%)
Blood loss (ml)	161,67 (80 – 260)
Remove drainage time (days)	5 (4–6)
Hospital stay (days)	6 (5–7)
Operative complications	
Dissected interface bleeding	2 (6,67%)
Blood vessel of renal hilar bleeding ***	1 (3,33%)
Postoperative complications	
Neuromuscular pain	3 (10%)
Examine postoperatively ****	
03 months	21 (70%)
06 months	18 (60%)

* 4 cases, there was old kidney surgery. The average operative time was 216 minutes.

** & *** This is a case of bleeding during control of the renal pedicle vascular, requiring open surgery to remove the kidneys, then hilar ligating en block.

**** The patients were examined after 3 and 6 months of surgery by

ultrasound, cardiopulmonary x-rays, blood tests and physical examination. Three months after surgery, no patients showed a hernia, trocar infection or local recurrence. After 6 months there was 1 case of metastases with liver metastases.

Whether it is a left or right renal operation, the key and first step are to search for and deal with the renal artery. After finding the renal artery and clamping it with Hem-o-lok, the safety of the operation is largely guaranteed, and the surgeon will become much calmer when he or she handles the renalvein.

Blood loss depends on tumor size and tumor complexity. Blood loss depends on some factors, such as tumor size, tumor complexity. These factors also effect operative time

We believe that with the integration of new methods post-operative hospital stays would decrease.

Figure 2. Blood vessels of kidney are clamped by Hem-o-lock and titanium clips

Figure 3. Specimens after removal (kidney and lymph nodes)

Characteristics of patients

Patients in our study had an average age of 53.23 years, male / female ratio = 16/14, right kidney tumor had 17 cases, the rate of tumor was found by chance (no Manifestations) are 26.67%. The main symptoms are dull ache in the lower back, hematuria, fever, and weight loss. According to Nguyen Buu Trieu, kidney

tumors are more common in middle-aged adults and up to twice as many men as women, right on the right side is similar to the left, tumors on the two sides are common in von Hippel's disease- Lindau (NguyễnBửuTriều, 2003). Vu Nguyen Khai Ca Và(2015)and Truong Thanh Tung (2005), who studied kidney cancer at Viet Duc Hospital and Central Military Hospital 108, showed that the rate of accidental detection of kidney tumors was about 14% - 25%.

Surgical indications

Indications for surgical treatment of kidney tumors are generally based on tumor characteristics and stage, following the 2014 Canadian Cancer Society guidelines for the treatment of cell carcinoma. kidneys: for tumors that are still in the pT1 stage to return often indicate partial kidney resection; For pT2 and pT3a tumors, Radical nephrectomy is preferred. Partial nephrectomy or radical nephrectomy can be performed by laparoscopic surgery, but most authors agree that partial renal endoscopy is often indicated for kidney tumors. In pT1a and below, the tumor is not too deep into the renal parenchyma, has sufficient distance to the renal pelvis and not near the large blood vessels of the kidney; Radical nephrectomy is usually indicated for kidney tumors from pT1b to pT3a, but for kidney tumors pT3b or more, it is very rare to undergo kidney endoscopy due to kidney tumors at this time. Have been invaded the surrounding organ or invaded a vein or vein (Ono et al., 2005; Rendon et al., 2014; van Oostenbrugge et al. 2018).

The patients in our study had tumors at pT2 stage and below, the average tumor size was 5.33cm, of which pT1b tumors accounted for 15/30 = 50%. There are 7 cases of benign neoplasm and 5 cases of nephropathy in pT1a stage but not indicated for partial renal resection because the tumor is located in the middle part of the kidney, deep into the parenchyma and close to the pyramidal system. Access road and number oftrocar:

For radical laparoscopic surgery, it is feasible to follow the peritoneal or retroperitoneal route. The abdominal cavity is usually wide, with clear anatomical landmarks, but the access to the renal vein is not as direct as the retroperitoneal line. Ono Y. said that the retroperitoneal route has a smaller workspace, but the operation time is shorter than the peritoneal route, especially in the case of old peritoneal surgery, the retroperitoneal route will be the optionto choose the optimal. The peritoneal passage is suitable for cases where an indication for complete removal of the kidneys, ureters and a part of the bladder wall due to tumor excretion, because after the ablation of the kidneys and upper ureters is complete, the surgeon only turning down and cutting the lower ureter and the wall of the bladder without having to create cavity like retroperitoneal line (Ono et al. 2005; Rendon et al. 2014; Fariborz et al. 2017).

In this study, the selection of the entrance is usually based on a number of criteria such as: having a history of surgery on the upper abdomen, choosing the retroperitoneal route; the size of the tumor is larger, the location of the tumor in the upper pole or in cases of excretion, then select the route through the abdominal cavity. Results showed that we had 13/30 = 43.33% in the abdominal route and 17/30 = 56.67% in the retroperitoneal route. Through the case we have done, the

retroperitoneal often has more advantages than the abdominal route if the surgery is large enough to control the renal artery vessels. The number of trocar we use for all cases is from 3 to 5 trocar, with the case of retroperitoneal usually only need 3 trocar is sufficient while the route through the abdomen can use 1 more Organ trojans even add a workingtrocar.

Treatment of renal vein blood vessels

Angioplasty is a key step in radical laparoscopic surgery. The general principle is to undergo surgery and early control of renal vein vessels, control arteries before posterior veins. Surgery required in these areas is the use of a prison head device, the kidney stem must always be stretched to identify the kidney vessels and its appendages, when the surgery must remove all surrounding organizations. to release each circuit separately and then clip with a clip, Hem-o-lock or Endo-GIA (Gill et al., 2010; Krabbe et al., 2014; Yang et al. 2019). For foreign authors, the use of Endo-GIA for renal vein cutting or entire renal vein block is widely applied, but the cost to use Endo-GIA is relatively high. Vu Le Chuyen, through his research on laparoscopic surgery, found that the combination of clips, Hem-o-lock and fastening just to clamp the kidneys is safe and suitable for Vietnamese conditions. However, he still warned against relying solely on Hem-o-lockalone.

Observing the patients in the study found that all cases were well aware of renal vein vessels, having 1 artery and 1 vein accounting for 70%, having morethan 1 artery or more than 1 vein accounting for 30%. The case of retroperitoneal access often straight into the kidney, favorable for vascular processing. Cases of entry through the abdominal cavity must be operated on the upper edge of the kidney to find and treat the renal vessels, sometimes to the lower edge of the kidney, in combination with the stretching of the renal pelvis and upper ureter to find and treat kidney vessels. We perform forceps cutting of kidney arteries and veins with clips, Hem-o-lock, and ligation. For each circuit, we usually clip alternating with both clip and Hem-o-lock according to the principle of Hem-o- lock and the clip must cover the circumference of the circuit, in case the circumference is too big for the size of Hem -o-lock and clip, they must be tied again with a small aperture before clamping again with Hem-o-lock and clip. We have one case of bleeding during the treatment of renal vascular artery (breaking into the premature division of sub-artery) to transfer open surgery and clamp cut together the renal peduncle into a mass with vicryl and line only.

Liberation around the kidney and ureter cut

In the process of surgical release around the kidneys, we always get the maximum amount of fat around the kidneys and Gerota weight, there is no case to cut the adrenal gland together or dredge regional lymph nodes. Our ureters were cut at the level of 1/3 above. There are 4 cases with old surgery, when the kidney stem and near the renal pelvis have the phenomenon of sticking to use an ultrasonicknife (Benway et al. 2009).

Traditionally, radical nephrectomy would include total nephrectomy, periportal fat layer, Gerota scales, lateral adrenal gland and regional lymph node dredging. However, at present, there are some viewpoints that change: Gabret al. (2014) proposed cutting only adrenal glands along the side when there is suspicion of adrenal gland invasion on images taken before surgery or found during surgery; Ono et al. (2005) wrote that regional lymph node dredging is also not beneficial in terms of treatment efficacy compared to non-regional lymph node dredge.

The results and rate of catastrophes

The surgical results showed that the average operating time was 116 minutes, only 4 cases had old surgery with an average operating time of 216 minutes. The average blood loss was 161 ml, drainage time and hospitalization time were 5 days and 6 days,respectively.

Accident during surgery: bleeding area accounted for 6.67%; hemorrhagic vascular bleeding 3.33%. Complications after surgery 10%, all cases are neuromuscular pain and resolves after a few days of treatment. 3.33% open surgery, this is a case of bleeding during the treatment of renal vascular artery due to violation of sub-branch of premature division of theartery.

Through the study of the complications and complications of radical nephrectomy by laparoscopic surgery, the rate of common complications was 18.8%, namely complications: bleeding; intestinal damage; fever; translation fluid;and neuromuscular pain. Thereby, he also warned that factors such as advanced age and heavy bleeding in surgery are potential risks that could increase the rate of postoperative complications (Zhang et al., 2013).

Check after 3 months and 6 months

After 3 months, we checked 21 patients, accounting for 70%. Patients with no hernia, trocar leg, local recurrence or distant metastasis.

After 6 months, we checked 18 patients, accounting for 60%. There is 1 case of metastatic liver, this is a case of post-tumor tumor, the extra life time after surgery is 9 months.

Nowadays, a large amount of studies found out that patients undergoing PRN had decreased rate of surgical complications, length of stay, need for blood transfusion etc. With recognition of this fact this method is getting more and more popular (Cwach and Kavoussi, 2016).

Laparoscopic renal surgery is far from being perfected. Physician’s goals for the future are to improve outcomes, decrease length of recovery while trying to cost effective and as lest invasive aspossible (Benway et al. 2009).

Robotic technologies are being developed, which can assist in completing different operations. It includes image guided robots that can help to introduce instrument or needles into the kidney safely to avoid organ injury.

Also in robot assisted partial nephrectomy (RAPN) tumor complexity does not affect operative time, while for LPN it does (Faiena et al. 2014; Bolton and Lynch, 2018; Luk et al. 2018).

CONCLUSION

Through researching 30 cases of autopsy surgery to treat kidney tumors at Thanh Hoa Provincial General Hospital, we found:

The average age of patients was 53.23 years, the ratio of male / female = 16/14, the rate of tumors was discovered casually 26.67%. Average tumor size 5.33 cm. Vascular muscle tumors accounted for 23.33%, renal cell carcinoma (RCC) 76.67% ,.

Access to the abdominal cavity accounts for 43.33%, the retroperitoneal access 56.67%. 70% of patients have 1 artery and 1 vein, more than 1 artery or more than 1 vein 30%. Treatment of renal peduncle clamp with Hem-o-lock, titanium clip and thread tie. The average surgical time was 116 minutes, the average blood loss was 161ml, the withdrawal time was 5 days and the hospital stay was 6 days. Accident during surgery: bleeding area accounted for 6.67%; hemorrhagic vascular bleeding 3.33%. Complications after surgery: neuromuscular pain 10%. Open surgery was3.33%.

After 3 months of postoperative examination, 21 patients (70%) had no hernia, trocar leg, local recurrence or distant metastasis. Examination after 6 months of surgery was 18 patients (60%), there was one case of metastatic liver, the extra life time after surgery was 9months.

With the help of robotics and technologies, renal surgery is now significantly less invasive, and operative outcomes are more positive. As modern technology develops, the envelope will continue to be pushed by urologists with the hope of improvement of patient outcomes and satisfaction.

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CONFLICTS OF INTEREST

The authors declare no conflict of interest.

REFERENCES

Benway B.M., Bhayani S.B., Rogers C.G., Dulabon L.M., et al. (2009). Robot assisted partial nephrectomy versus laparoscopic partial nephrectomy for renal tumors: a multi-institutional analysis of perioperative outcomes. *J. Urol.*, 182(3):866-873.

Bolton E.M. and Lynch T.H. (2018). Impact of warm ischaemia time during partial nephrectomy on renal function–is it really a matter of time? *BJU Int.*, 121(1):3-4.

Cwach K. and Kavoussi L. (2016). Past, present, and future of laparoscopic renal surgery. *Investig. Clin. Urol.*, 57 (Suppl 2):110-113.

Faiena I., Han C.S., and Olweny E.O. (2014). Laparoscopic partial nephrectomy: state of the art review. *Open Acc. Surg.*, 7:59-69.

Fariborz B., Pusztai C., Farkas L., Buzogány I., et al. (2017). Laparoscopic partial nephrectomy

in warm ischemia: imapct of parenchymal loss on kidney function. *Magyar Urol.*, 2017(4):158-166.

Gabr A.H., Steinberg Z., Eggener S.E., and Stuart Wolf Jr J. (2014). Indications for adrenalectomy during radical nephrectomy for renal cancer. *Arab J. Urol.*, 12(4):304-308.

Gill I.S., Aron M., Gervais D.A., and Jewett M.A. (2010). Clinical practice. Small renal mass. *N. Engl. J. Med.*, 362(7):624–634.

Janicic A., Bumbasirevic U., Pekomezovic T., Cekerevac M., et al. (2016). Partial versus radical nephrectomy for pT1a renal cancer in Serbia. *J. BU ON*, 21(6):1449-1453.

Krabbe L.M., Bagrodia A., Margulis V., and Wood C.G. (2014). Surgical management of renal cell carcinoma. In *Seminars in Interventional Radiology* (Vol. 31, No. 1, p. 27). Thieme Medical Publishers.

Liu G., Ma Y., Wang S., Han X., et al. (2017). Laparoscopic versus open radical nephrectomy for renal cell carcinoma: a systematic review and meta-analysis. *Transl. Oncol.*, 10(4):501-510.

Luk A.C.O., Pandian R.M.K., and Heer R. (2018). Laparoscopic renal surgery is here to stay. *Arab J. Urol.*, 16(3):314-320.

NguyễnBửuTriều. (2003). *BệnhHọcTiếtNiệu*. HàNội: NXB Y Học.

Ono Y., Hattori R., Gotoh M., Yoshino Y., et al. (2005). Laparoscopic radical nephrectomy for renal cell carcinoma: the standard of care already? *Curr. Opin. Urol.*, 15(2):75-78.

Rendon R.A., Kapoor A., Breau R., Leveridge M., et al. (2014). Surgical management of renal cell carcinoma: Canadian Kidney Cancer Forum Consensus. *Can. Urol. Assoc. J.*, 8(5-6):e398-e412.

Trương Thanh Tùng. (2005). *Đặcđiểmlâmsàng, cậnlâmsàng, môbệnhhọcvàchẩnđoánungthưthận ở ngườilớn. Luậnvănthạcsĩ*. HọcViệnQuân Y.

van Oostenbrugge T.J., Fütterer J.J., and Mulders P.F. (2018). Diagnostic imaging for solid renal tumors: a pictorial review. *Kidn. Canc.*, 2(2):79-93.

Vũ Lê Chuyên. (2007). *Ápdụngkỹthuậtcắtbỏthận qua nộisoi. ĐềtàinghiêncứucấpThànhPhốnăm.*HồChíMinh: Sở Y Tế TP.

VũNguyễnKhải Ca Và. (2015). Nhậnxétđặcđiểmlâmsàng, cậnlâmsàngvàkếtquảđiềutriphẫuthuậtungthưthậntạibệnhviệnViệtĐứctừnăm 2012 đến 2014. *Y Học TP HCM*, 19(4):264-269.

Yang F., Zhou Q., Li X., and Xing N. (2019). The methods and techniques of identifying renal pedicle vessels during retroperitoneal laparoscopic radical and partial nephrectomy. *W. J. Surg. Oncol.*, 17(1):1-8.

Zhang Z.L., Li Y H., Luo J.H., Liu Z.W., et al. (2013). Complications of radical nephrectomy for renal cell carcinoma: a retrospective study comparing transperitoneal and retroperitoneal approaches using a standardized reporting methodology in two Chinese centers. *Chin. J. Cancer*, 32(8):461-468.