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TRANSUMBILICAL LAPAROSCOPIC SIMPLE NEPHRECTOMY USING A FLEXIBLE CYSTOSCOPE AND STANDARD LAPAROSCOPIC INSTRUMENTS

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Summary.- *OBJECTIVES:We present our initial experience with transumbilical surgery in a simple nephrectomy performed with a flexible cystoscope and standard laparoscopic instruments.*

METHODS: A 15 year-old child, with severe left renal parenchyma atrophy, secondary to recurrent urinary tract infection (UTI) complicated with left pyelonephritis. Decision for simple nephrectomy was taken and we planned to perform a single port laparoscopic nephrec-tomy. In the lumbotomy position, two 5mm ports were insertend through a 3 cm umbilical incision. One trocar permitted the progression of the flexible cystoscope (Olympus®) and the other the entrance of the PKS Plasma Trissector®. The latter was then changed for a 10mm port to allow the entrance of the Weck clips. A Maryland grasper for countertraction was placed without port in the lef-upper quadrant and progressed directly into de peritoneal cavity under direct vision.

RESULTS: The standard laparoscopic steps were duplicated uneventfully. Mean operative time was 90 minutes and mean blood loss was 200 mL. Hospital stay was 18 hours. No transfusion was needed.

CONCLUSION: Single port urologic surgery will expand in the future. There is lack of commercial availability of the ideal hardware needed for the procedures. Versatility of urologic instruments allow for its use in different settings.

Keywords: *Transnatural orifice surgery. Simple nephrectomy. Laparoscopy.*

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Resumen.- *OBJETIVO: Presentar nuestra experiencia inicial con la cirugía transumbilical en una nefrectomía simple realizada con un cistoscopio flexible e instrumentos laparoscópicos estándar.*

MÉTODOS: Paciente de 15 años de edad, con diagnóstico de atrofia renal izquierda, secundaria a infección urinaria recurrente. Se decidió una nefrectomía simple y se planeó realizarla por vía laparoscópica a través de un puerto único. En posición de lumbotomía y a través de una incisión transumbilical de 3 cm., dos puertos de 5mm fueron colocados en el ombligo. Un trócar permite la progresión del cistoscopio flexible (Olympus ®) y el

otro la entrada del disector bipolar Este último fue cambiado por un puerto de 10 mm para permitir la entrada de los clips de Weck. Se introdujo un grasper Maryland en el cuadrante superior izquierdo, sin puerto, para la contra tracción, el cual fue avanzado directamente en la cavidad peritoneal bajo visión directa.

RESULTADO: Los pasos estándar de la cirugía laparoscópica se replicaron sin inconvenientes. El tiempo quirúrgico fue de 90 minutos y la pérdida sanguínea de 200 ml. La estadía hospitalaria fue de 18 horas. No se necesitó transfusión.

CONCLUSIONES: La cirugía urológica de puerto único se ampliará en el futuro. Hay una falta de disponibilidad comercial de los insumos ideales para el desarrollo de esta cirugía. La versatilidad de los instrumentos urológicos permitirá su uso en diferentes contextos.

Palabras clave: *Cirugía a través de orificios naturales. Nefrectomía simple. Laparoscopía.*

INTRODUCTION

The initial experience in transnatural orifice surgery was performed by Antony Kalloo in transgastric surgery in 2004 (1). The preliminary experience with transnatural orifice surgery confronted several questionings such as the safety entrance into a healthy hollow organ lumen while minimizing potential morbidity (2).

The well known concept of triangulation in laparoscopic surgery implies the use of 3 trocars for right performance. The risk related to the use of trocars has been reported of 0.003-0.3 % for both vascular and visceral injuries (3). Deployment of a single trocar would diminish a low percentage of injuries with the caveat of difficult surgical performance due to the lack of space. The latter has been addressed through the design of novel bent instruments with wide maneuverability.

The transnatural orifice approach has been successfully reported. Cholecystectomy has been performed through transvaginal approach or by a technique which gathered the ports at the umbilicus (4,5). Appendectomies have been reported through transgastric approach or with the use of a single port technique (6). We have witnessed enormous advances for laparoscopic surgery in the last few years and the options for the adequate performing of this surgery are growing on an everyday basis. The novel transnatural orifice surgery is in the spotlight nowadays and we present our initial experience with this surgical approach.

TECHNIQUE

A 15 years old child, with previous medical history of painful haematuria and lower urinary tract symptom (LUTS). He referred LUTS after surgical treatment for phymosis. The patient developed a recurrent urinary tract infection (UTI) complicated with left pyelonephritis. A DMSA renal cintigraphy identify a left renal function of 13.7%.

Due to a new episode of lumbar pain and UTI, a second renal cintygram was performed. It showed a severe left renal parenchyma atrophy and function of 11.9%. Decision for simple nephrectomy was taken and we planned to perform a single port laparoscopic nephrectomy. The procedure was fully explained to both patient and his family and they consented it.

Equipment

- Conventional laparoscopic equipment and instruments (Dissectors, Graspers, Scissors, suction device).

- Flexible Cystoscope Olympus®

- One 10 mm trocar, and two 5 mm trocar and Monarch retrieval system (Applied Medical, Rancho Santa Margarita, CA)

- Clip Applying Forceps Pilling Weck. Medium size.

- Weck clips Medium size.

- PKTM G400® Workstation and PKS Plasma Trissector (Gyrus ACMI Inc, Southborough, MA).

Surgical Description

The patient was placed in lumbotomy position under general anesthesia. Pneumoperitoneum was created with Veress technique and a transumbilical incision of 3 cm. performed. Then, two 5mm ports were placed gathered at the umbilicus. One trocar permitted the progression of the flexible cystoscope (Olympus®) and the other the entrance of the PKS Plasma Trissector® (Figure 1). The latter was then changed for a 10mm port to allow the entrance of the Weck clips. A Maryland grasper for countertraction was placed without port in the lef-upper quadrant and progressed directly into de peritoneal cavity under direct vision (Figure 2). Surgical exposure was veri-

FIGURE 1.

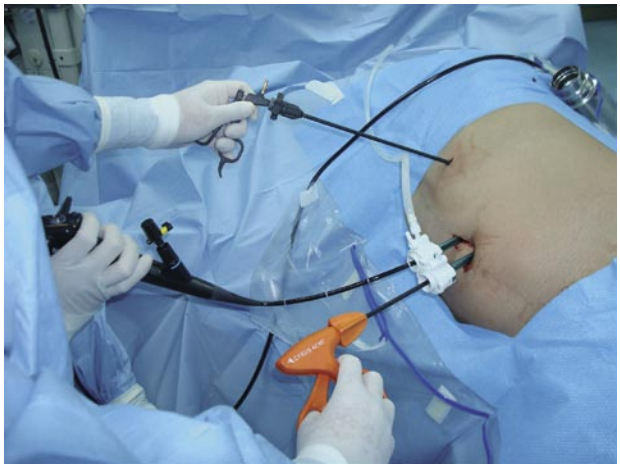

FIGURE 2.

fied adequate with the use of the flexible cistoscope and the standard laparoscopic steps were duplicated through uneventfully. We experienced a difficult dissection of the renal pedicle, secondary to fibrosis. Procedure was successfully completed without complications. Mean operative time was 90 minutes and mean blood loss was 200 mL. Hospital stay was 18 hours. No transfusion was needed (Figure 3).

DISCUSSION OF THE TECHNIQUE

The umbilicus is an embriologically natural orifice and since the beginning laparoscopic surgeons have performed their procedures through the birth´s natural scar. Transnatural orifice surgery can be safely performed through the umbilicus and laparoscopy has evolved from offering benefits of analgesic reduction, rapid postoperative recovery, and patient satisfaction using several small incisions, to offer the same byproducts but with the use of a single access (7,8).

FIGURE 3.

Through studies using animal models and clinical experience, benefits of laparoscopy has been developed and redefined. In the field of urologic minimal access surgery in 2002, Gettman et al performed a complete transvaginal laparoscopic dissection and nephrectomy in a porcine model using a single, 5-mm abdominal port for visualization. They acknowledged limitations imposed by the porcine anatomy and available laparoscopic instruments. This attempt to the transnatural orifice surgery did completely comply with its own definition, as it did not require any abdominal incision. It is interesting how urologists have brought a great deal of novel ideas into the field of general access surgery, if one realizes that the experimental work by Gettman and collegues was performed years in advanced of the "official" beginning of transnatural orifice surgery. More recently, a collaborative research group was formed to build a prototype system of magnetically anchored instruments for trocar-free laparoscopy. The mentioned prototype system was then evaluated in vivo in a porcine laparoscopic nephrectomy model with promising results (9). Raman and collegues presented single keyhole nephrectomy in a porcine model and three human patients. Laparoscopic nephrectomy was performed with either a novel single 25-mm port or using one 10-mm and two 5-mm adjacent trocars. Bent laparoscopic graspers were used for dissection. Indications for nephrectomy included chronic infection in a nonfunctioning kidney in 2 patients, and a 4.5-cm enhancing renal mass in the other patient. The procedure

was successfully completed in all 3 human patients with mean operative time of 133 minutes (10).

The Cleveland Clinic Foundation (CCF) has presented their experience with the single port surgical approach. Desai et al presented the first initial clinical experience of organ-ablative and reconstructive renal surgery with single port. Transumbilical nephrectomy and pyeloplasty using the R-Port (Advanced Surgical Concepts) was performed. They employed articulated instruments in addition to standard laparoscopic instrumentation and also a 2-mm needle-port (MiniSite, USSC, Norfolk, CT, USA) to facilitate suturing. Procedures were successfully accomplished with no extra-umbilical skin incisions and adequate results (11). Kaouk et al from CCF, have presented a clinical series of ten patients operated by single-port technique for procedures like laparoscopic renal cryotherapy, wedge kidney biopsy, radical nephrectomy, and abdominal sacrocolpopexy (12). Their early results show feasibility with good outcomes. Single trocar surgery for varicocelectomy has been also presented by Kaouk & Palmer, also from CCF group, in three adolescents patients (13).

The radical nephrectomy technique with single port surgery has been assessed by Ponsky and coworkers (14). This experience was undertaken in a patient with an enhancing renal tumor. The technique featured three trocars (12 mm, 10 mm, and 5 mm) through a GelPort device and the use of only standard laparoscopic instruments.

Herein, we present an initial experience with transumbilical laparoscopic surgery with the use of flexible cystoscope. The main difficulty in our experience was to obtain any port device and articulated instruments which were commercially available. The latter indulged us to verify our possibilities with the available instruments in order to initiate the experience. The deploy of the cystoscope allowed for an adequate laparoscopic view and the gathering of the ports at the umbilicus did not difficult the surgical performance. Eventhough, we consider reasonable for our first case to place the Maryland grasper directly into peritoneal cavity in order to facilitate exposure. This might not comply with the definition of transumbilical surgery but we choose for the safest option. The switching of 5mm ports for 10mm was verified feasible if necessary and considering the known difficulties of simple nephrectomy in the inflammatory setting (15), our threshold for convertion to regular laparoscopy or open surgery was very low. With the experienced obtained we consider that the placement of the three port transumbilically is feasible and we attempt to do so in upcoming cases.

ROLE IN ENDOUROLOGY

Single port approach has arrived for good. Urology, as done in other areas of medical related technology will play an important role in the refinement of the technique. Urologic teams have gathered to make a consensus on the subject and solid outcomes will be provided by this (16). The aim is to objectively evaluate outcomes and beyond our personal hope verify the real benefits of the technique. Prompt availability of single port devices will provide expanding experiences with the technique.

CONCLUSIONS

Single port urologic surgery will expand in the future. There is lack of commercial availability of the ideal hardware need it for the procedures. Versatility of urologic instruments allow for its use in different settings.

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