Author’s response to reviews

Title: Robot-assisted laparoendoscopic single-site surgery for the simultaneous management of multiple urinary tract calculi: a case report and experience sharing

Authors:

Fan Zhang (solidzf@126.com)
Lisong Shan (286650601@qq.com)
Jiahui Yin (yinxiaotai1995@163.com)
Luyang Liu (1303792798@qq.com)
Pengchao Wang (756791458@qq.com)
Shengkun Sun (ssk301@sina.com)
Xu Zhang (xzhang@tjh.tjmu.edu.cn)
Hongzhao Li (urolancet@126.com)
Xin Ma (urologist@foxmail.com)
Gang Guo (greenguo@sina.com)
Qiming Liu (lqm1199@163.com)

Version: 1 Date: 14 Dec 2019

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The detailed point-by-point responses to reviewers are as follows:

Responses to Prof. Daniele Castellani (Reviewer #1):

a. Case presentation

1. The patient's stone burden, particularly in the pelvis and in the ureter, should be better explained to choose the suitable treatments. The authors should report the number, size and location of each stone correctly. I can see one ureteral stone and 3 caliceal stones. Is that correct?

Response to reviewer: Thank you so much for your valuable comments. The preoperative CT and three-dimensional reconstruction CT image show that three calculi are located in the right kidney, one calculus is located in the right upper ureter, and three calculi are located in the
bladder. As the reviewer suggested, we have revised the manuscript by adding the number, size, and location of each calculi at “Case presentation section, line 84-93”.

2. Furthermore, we have no data regarding the Hounsfield unit of pelvic and ureteral stone. Were the stone radiolucent or not? Could have the stones be suitable for oral dissolution?

Response to reviewer: Thank you so much for your valuable comments. The hounsfield unit of three renal calculi are 1174 Hu, 1036 Hu, and 1052 Hu, respectively. The hounsfield unit of one ureter calculi is 1098 Hu. The hounsfield unit of three bladder calculi are 529Hu, 558 Hu, and 564 Hu, respectively. As the reviewer suggested, we have revised the manuscript by adding these data at “Case presentation section, line 87-92”. Unfortunately, the preoperative KUB examination is not performed. We do not know whether the calculi are radiolucent or not. We will improve this drawback in the subsequent study. The preoperative CT scan show that the hounsfield unit of the renal calculi and ureter calculi are more than 1000 Hu, so we did not choose the oral dissolution as the treatment.

3. The preoperative CT scan showed grade III-IV hydronephrosis, with poor residual parenchyma. Why was preoperative upper tract drainage not performed, followed by MAG-scan to understand the function of the right kidney? In the case of very poor function, nephrectomy could have been a better option.

Response to reviewer: Thank you so much for your valuable comments. The preoperative CT scan showed grade III-IV hydronephrosis, with poor residual parenchyma. Indeed, we all agree with the reviewer’s opinion that the nephrectomy may be a better option for this patient if there is no residual function of the right kidney. The isotope renogram result showed that the preoperative GFR of the right kidney was 17.81 ml/min. There is still some residual function of the right kidney. That why we decided to preserve the right kidney and try our best to remove all the calculi. The postoperative GFR of the right kidney was 26.33 ml/min. The recovery of the renal function indicate that this kidney deserves preservation. The upper urinary tract drainage alone with the subsequent kidney function examination was one of our choices. But we finally chose RA-LESS instead of upper urinary tract drainage mainly because the RA-LESS can simultaneously achieve these two goals: to clear all the calculi and to drain the hydronephrosis of upper urinary tract. We also have revised the manuscript by adding the GFR at “Case presentation section, line 82-84, line 144-146”.

b. Surgical procedure

The paragraph is too long, and the surgical steps (ureterolithotomy, pyelolithotomy, and cystolithotomy) are well known. It would be more interesting to have a short surgical clip instead of a lengthy description of the surgical steps (not longer than 5 minutes, supplementary file).

Response to reviewer: Thank you so much for your valuable comments. As the reviewer suggested, we have revised the “Surgical procedure section, line 110-128”. We also have added a video clip of surgical procedure as an additional file (see Additional file 1: Video clip).
c. Results

The follow-up CT scan was performed 3-months after surgery (figure 4). Why was double J stent still in place? Was the stent left for such a long time?

Response to reviewer: Thank you so much for your valuable comments. Indeed, the D-J stent was left for a long time. The reason is that this patient did not follow our standard follow-up protocol due to his personal affairs. Three months after the surgery, this patient came to our hospital for the examinations. The double-J stent was removed after finishing the CT scan, and no calculi was attached on the stent wall. We have revised the manuscript by adding this sentence at “Case presentation section, line 141-142”.

d. Discussion

The authors stated that endoscopic surgery was not suitable in the present patient because it could have been difficult to clear all renal and ureteral stones in a single session. I disagree with them. Simultaneous treatment of renal and ureteral stones (ECIRS: Endoscopic Combined IntraRenal Surgery) has been demonstrated being feasible and safe, allowing tailoring of the procedure on the patient, the dynamic anatomy of the collecting system and the urolithiasis (see: Scoffone CM, Cracco CM. Invited review: the tale of ECIRS (Endoscopic Combined IntraRenal Surgery) in the Galdakao-modified supine Valdivia position. Urolithiasis. 2018 Feb;46(1):115-123. doi: 10.1007/s00240-017-1015-9). ECIRS should have been considered an option in the present patient, and this should be better discussed in the paper. Bladder stone could have been treated by simple transurethral holmium laser lithotripsy. Therefore, a laparoscopic approach to the upper tract could have also been an option in this patient.

Response to reviewer: Thank you so much for your valuable comments. ECIRS is a combination of traditional PCNL and retrograde ureteroscopy. It was initially used in the year of 2008, and became more and more popular in recent years. ECIRS can be utilized to remove kidney and ureter calculi simultaneously. It has been demonstrated that ECIRS is feasible and safe for patients with large and/or complex urolithiasis. We all agree with the reviewer’s opinion that the ECIRS is an excellent surgical method for this patient. Besides the ECIRS, transurethral holmium laser lithotripsy and laparoscopic approach to the upper urinary tract could have also been another option for this patient. We finally choose RA-LESS surgery mainly based on the following considerations: first, the patient has an open ureterolithotomy history, the condition of the ureteral cavity is unclear. The preoperative CT scan show a tortuous upper ureter. The retrograde ureteroscopy may not be succeed in approaching the calculi location. Second, the calculi are distributed in the different renal calices, more than one working channel may be needed during the ECIRS. The potential risk of bleeding may be increased during the operation. Third, pure endoscopic surgery may extend operative time and raise the chance of infection and potential perioperative complication and may thus prolong hospital stay. Lastly, the previous open ureterolithotomy may add risks and difficulties for traditional surgical methods such as ECIRS and laparoscopic surgery. When compared with ECIRS and laparoscopic surgery, robotic surgery has more advantages in suturing and dissociating, and may avoid above unfavorable factors. We have revised the discussion section by adding this part at “Discussion and conclusions section, line 159-178”.
Special thanks to Prof. Daniele Castellani for the valuable comments.

Responses to Prof. Luigi Schips (Reviewer #2):

1. Even if the major diameter of calculi was 4 cm authors should specify the dimension of each calculus.

Response to reviewer: Thank you so much for your valuable comments. The multiple calculi of this patient are located in the right kidney, the right upper ureter, and the bladder. This is not a common case. RA-LESS only provides surgeons with another option except for the traditional surgical methods such as ECIRS and laparoscopic surgery. RA-LESS can be used for the selected patients with the strict indication. This procedure still cannot replace the traditional surgical methods. As the reviewer suggested, we have revised the manuscript by adding the dimension of each calculi at “Case presentation section, line 87-93”.

2. Do the authors performed a enhanced CT scan with contrast to study the function of the affected kidney. From the CT scan it seems like that the residual function of that kidney may not justify a complex operation as described by the author. If no residual function was present, a radical nephrectomy should be performed.

Response to reviewer: Thank you so much for your valuable comments. The preoperative CT scan showed a hydronephrosis of the right kidney, and the residual function may be very poor. We all agree with the reviewer’s opinion that the nephrectomy may be a better choice if no residual function was present. We performed isotope renogram instead of enhanced CT scan with contrast to study the function of the right kidney. The result showed that the preoperative GFR of the right kidney was 17.81 ml/min. There was still some residual function of the right kidney. We decided to preserve the right kidney and try the best to remove all the calculi. Three months after the RA-LESS surgery, the isotope renogram result showed that the GFR of the right kidney was 26.33 ml/min. The recovery of the renal function indicate that this kidney deserves preservation. We have revised the manuscript by adding the GFR at “Case presentation section, line 82-84, line 144-146”.

3. Moreover, how was the kidney function after the operation?

Response to reviewer: Thank you so much for your valuable comments. Three months after the RA-LESS surgery, the isotope renogram result showed that the GFR of the right kidney was increased to 26.33 ml/min. We have revised the manuscript by adding the postoperative GFR at “Case presentation section, line 144-146”.

4. Other endoscopic procedures such as ecirs could apply in this case, allowing a fast and effective treatment of the upper tract urinary calculi.
Response to reviewer: Thank you so much for your valuable comments. ECIRS can be utilized to remove kidney and ureter calculi simultaneously. It has been demonstrated that ECIRS is feasible and safe for patients with large and/or complex urolithiasis. We all agree with the reviewer’s opinion that the ECIRS is an excellent surgical method and could be applied in this case. We finally choose RA-LESS surgery mainly based on the following reasons: first, the patient has an open ureterolithotomy history, the condition of the ureteral cavity is unclear. The preoperative CT scan also showed a tortuous upper ureter. The retrograde ureteroscopy may not be succeed in approaching the calculi location. Second, the calculi are distributed in the different renal calices, more than one working channel may be needed during the ECIRS. The potential risk of bleeding may be increased during the operation. Third, pure endoscopic surgery may extend operative time and raise the chance of infection and potential perioperative complication and may thus prolong hospital stay. Lastly, the previous open ureterolithotomy may add risks and difficulties for traditional surgical methods such as ECIRS and laparoscopic surgery. When compared with ECIRS and laparoscopic surgery, robotic surgery has more advantages in suturing and dissociating, and may avoid above unfavorable factors. We have revised the discussion section by adding this part at “Discussion and conclusions section, line 159-178”.

Special thanks to Prof. Luigi Schips for the valuable comments.