



Case Report

The case report of surgical and medical co-management in a triple organs resection surgery

Lu Wenning^a, Meng Xiangfei^b, Wang Rong^a, Zhang Liping^a, Liu Chaoyang^a, Cheng Rui^{a,*}^a Department of Comprehensive Surgery, The Second Medical Center & National Clinical Research Center for Geriatric Diseases, Chinese PLA General Hospital, Beijing, 100853, China^b Department of Hepatobiliary, The First Medical Center, Chinese PLA General Hospital, Beijing, 100853, China

ARTICLE INFO

Keywords:

Robotic-assisted surgery
Surgical and medical co-management
Synchronous resection
Case report

ABSTRACT

Introduction: and Importance: There have been few studies in the literature that report patient have triple combined procedures done via minimally invasive approaches. We report a co-management SMC intervention helped an 88-years-old patient with multiple surgery risk factors have combined procedures done via robotic-assisted approaches at one sitting with excellent surgical outcomes.

Case presentation: We describe the surgical and medical co-management (SMC) intervention of a 88-year-old male patient who was found to have colonic carcinoma, right renal carcinoma, gall bladder stones, hypertension, plmonary interstitial fibrosis, atrioventricular block. The patient underwent simultaneous triple robotic-assisted laparoscopic surgery procedure consisting of right partial nephrectomy, right hemicolectomy and cholecystectomy using robot. Perioperative optimization approach was recommended and planned after consultation with group comprises internists and surgeons. The internists rounds on the patient daily and helps to manage all chronic medical comorbidities. He was discharged without any severe complications.

Conclusions: This case shows the feasibility and safety of the synchronously triple robotic surgical treatments, with clinic outcomes that is better with that of the separately. SMC approach may maximize therapy efficiency and patient recovery in elder patients with chronic disease who has significantly higher postoperative complications.

1. Introduction

The number of patients with synchronous carcinoma malignancies has been increasing over the recent years because of carefully examination before surgery [1,2]. Thus, the demand for combined medical services in patients, especially in elder patients with chronic disease who has significantly higher postoperative complications, poses a new challenge for surgeons. Surgical and medical co-management (SMC) team should be addressed about therapeutic challenges [3]. The SMC team comprises of surgeons and internists, is a patient centered, protocol-driven collaborative model used to optimize the therapy of surgical patients.

There have been few studies in the literature that report patient have triple combined procedures done via minimally invasive approaches [4]. We report a co-management SMC intervention helped an 88-year-old patient with multiple surgery risk factors have combined

procedures done via robotic-assisted approaches at one sitting with excellent surgical outcomes.

This case report has been reported in line with the SCARE Criteria [include citation [5].

2. Presentation of case

A 88-years-old man visited our hospital because of positive fecal occult blood test. Colonoscopy showed colon tumor located at the hepatic flexure but no distant or lymph node metastases. Examination of Colonoscopy showed rectal cancer (Fig. 1A). His medical history included hypertension, hyperlipidemia, arrhythmia of atrioventricular block and chronic plmonary interstitial fibrosis. Drugs used including rosuvstatin, amlodipine besylate, no aspirin. He smoked and alcohol for fifty years. On preoperative PET imaging and abdominal CT he also had a 2.8 cm right renal mass at the middle pole. The mass appeared

* Corresponding author.

E-mail addresses: luwenningkerry@163.com (L. Wenning), mengxf301@126.com (M. Xiangfei), wangrong6969@126.com (W. Rong), hao_1900@sina.com (Z. Liping), midsunliu@aliyun.com (L. Chaoyang), chengrui2017@163.com (C. Rui).

<https://doi.org/10.1016/j.amsu.2021.102669>

Received 22 June 2021; Received in revised form 3 August 2021; Accepted 3 August 2021

Available online 5 August 2021

2049-0801/© 2021 The Authors. Published by Elsevier Ltd on behalf of IJS Publishing Group Ltd. This is an open access article under the CC BY-NC-ND license

(<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

exophytic and showed heterogeneous enhancing: the imaging features were consistent with Clear cell carcinoma of the kidney (Fig. 1B). He also had gall bladder stones in abdominal MRI (Fig. 1C). His pulmonary function tests showed FEV1 = 80% of predicted and oxygen partial pressure (80 mmHg) of arterial blood, staging chest CT scan show servers chronic diffuse interstitial fibrosis of the lungs (Fig. 1D). American Society of Anesthesiologists (ASA) class score is 3 (a patient with severe systemic disease) and obesity of BMI (29.3 Kg/m²).

Operative procedure: A multidisciplinary surgical approach was recommended and planned after consultation with an urologist, a colorectal and a hepatobiliary surgeon. The patient underwent simultaneous triple robotic-assisted laparoscopic surgery (RAS) procedure consisting of right partial nephrectomy, right hemicolectomy and cholecystectomy using robot da Vinci® Xi (Intuitive Surgical Inc). The partial nephrectomy was performed first. Renal enucleation was performed with 20 min renal ischemia (Fig. 2A). The hand assisted incision was closed. The patient repositioned in lithotomy position and the robotic cholecystectomy procedure performed (Fig. 2B). The colectomy was performed following cholecystectomy using the same hand assisted access (Fig. 2C). Total operative time was 480 min with robotic time of 360 min.

Interventions Performed by SMC: Perioperative optimization approach was recommended and planned after consultation with SMC group. The internists rounds on the patient daily and helps to manage all chronic medical comorbidities. Acute medical or surgical conditions, or both, and complications are managed cooperatively by surgeons and internists. The patient received medical prehabilitation includes: lifestyle (stop smoking), medical (medication review), other (breathing exercise regimen). We did a protective ventilation approach, based on the combination of low tidal volumes (≤ 6 mL/kg ideal body weight), adequately titrated positive end-expiratory pressure (PEEP) and of

inspired oxygen (100%FiO₂) to maintain satisfactory arterial oxygen saturation. Rehabilitation was standardized with bronchial toilet beginning in the immediate postoperative period, to include intensive chest physiotherapy (30 min twice a day), incentive spirometry, early ambulation, and oxygen supply through a mask to ensure an arterial oxygen saturation of more than 90%. We did goal-directed fluid therapy and early pull out of nasogastric tube to minimizing organ dysfunction, early oral feeding to preservation of gastrointestinal function, active pain control (opioid-sparing anesthesia and analgesia, localanesthetin filtration of incisions), and promotion of patient autonomy including early mobilization.

Outcomes: Postoperative, the pain score ranged from 1 to 3, mean 2.2. He resumed normal bowel activity on the 1st and oral diet was administered 2days after surgery. At 10 days after surgery, the bowel integrity was restored. Histopathologic examination of clear cell renal cell carcinoma, moderately differentiated adenocarcinoma of the colon, and chronic cholecystitis. He was discharged with no any severe perioperative complications.

3. Discussion

We report on RAS for synchronous triple abdominal lesions in colorectal cancer, renal cancer and gallstones of an aged patient with multiple chronic diseases.

With the widespread use of imaging techniques like ultrasound, CT scan and MRI, the incidence of synchronous tumor is increasing before operate examination in the last decade, colorectal and renal carcinoma have been reported occur synchronously either [6]. The treatment of synchronous carcinoma is, preferably, synchronous resection. Gallstone disease (GD) is one of the most common abdominal conditions [7] and is highly concurrent in colorectal cancer patients [8]. Acute cholecystitis

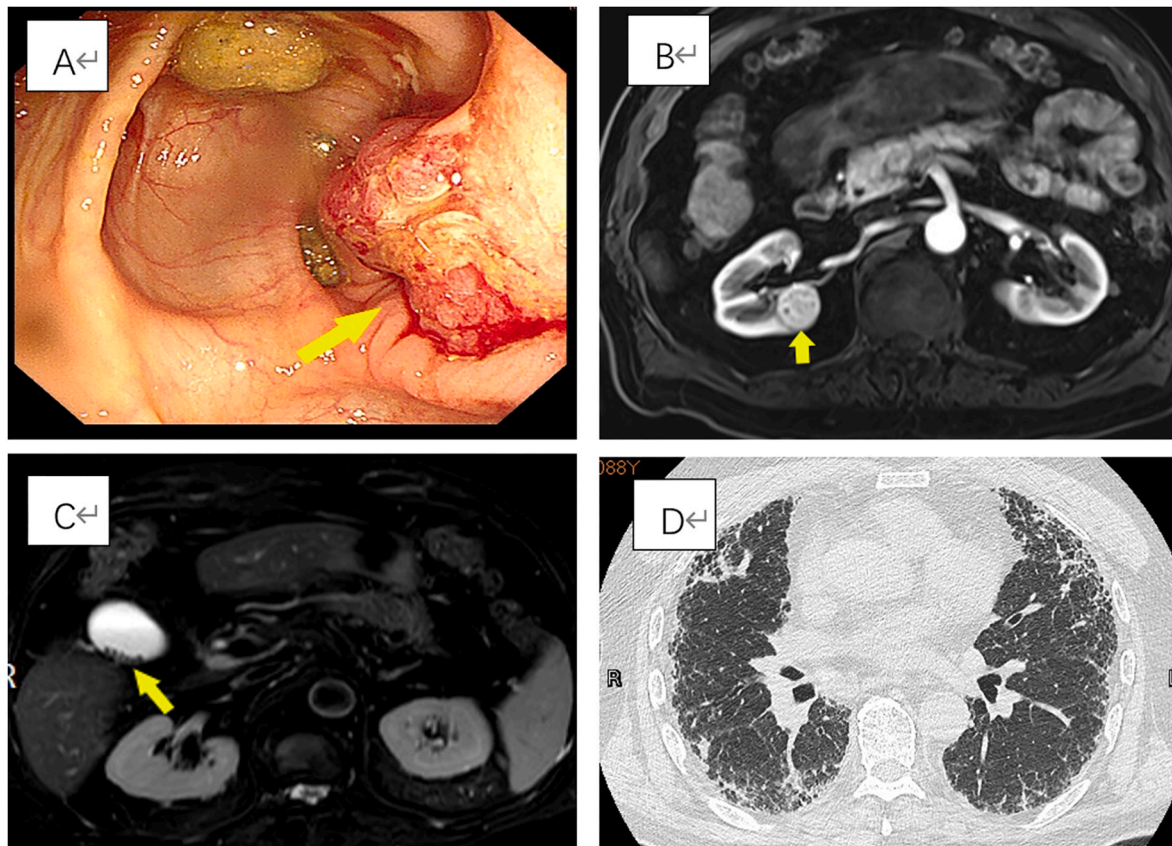


Fig. 1. The examination images before the operation: A. Colonoscopy showed rectal cancer; B. Carcinoma of the kidney in abdominal MRI; C. gall bladder stones in abdominal MRI; D. Staging chest CT scan show servers chronic diffuse interstitial fibrosis of the lungs.).

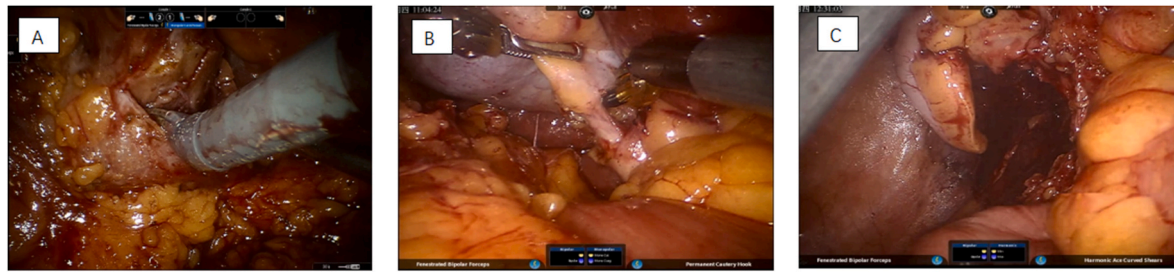


Fig. 2. The images of the operation: A. the 1st step of the operation is partial nephrectomy; B. Cholecystectomy. In this snapshot, the cystic duct was isolated; C. right hemicolectomy. The picture shows a scene from the robotic-assisted right hemicolectomy.).

after colectomy is a common complication. In view of the mortality from cholecystitis, prophylactic cholecystectomy may be necessary. The laparoscopic surgery has shown to be feasible and safe, and it has become the gold standard of synchronous resection due to advantages of minimally invasive surgery. When compared with a single laparoscopic procedure, combined procedures did not increase postoperative pain, hospitalization, or recovery period [9]. Following the recent introduction of the DaVinci system, RAS has been attempted in various fields. Furthermore, it has been suggested that robotic surgery has several advantages when compared to standard laparoscopic surgery. Optics, ergonomics, a higher degree of precision in surgeon's hand, are all enhanced with the use of a robotic platform [10]. There are few cases of simultaneous laparoscopic surgery for colorectal cancer and genitourinary cancer, therefore no case is report of triple simultaneous RAS for colorectal cancer, renal cancer and gallstones. We first report on the RAS for synchronous triple abdominal lesions in colorectal cancer, renal cancer and gallstones of an aged patient with multiple chronic diseases. In our current case, the operative time taken to perform the combined surgical procedure was almost the same as the total time taken if all the surgical procedures were done separately. An oral diet was resumed in a similar manner as done for the patient undergoing a single colectomy procedure. On analysis of the preoperative pain scores, it appeared that the pain scores in the patient was not significant increase than in a single score of the three separate surgical procedures. RAS has shown to be feasible and safe, and it may become the standard operate of synchronous resection due to advantages of minimally invasive surgery.

Strengthening the perioperative management of surgery by preventing and treating complications timely are important for the reduction of perioperative mortality in elective surgery. In addition to admission to the ICU, there are two proposals to improve outcome in highly risk surgical patients: co-management and critical care outreach [11,12]. Studies of perioperative co-management or critical care outreach have provided active results for improved patient outcomes. Co-management and critical care outreach for high risk surgical patients have been proved to decrease postoperative complications and mortality [13]. A study reporting the association of the co-management program intervention in 2 key surgical services—Orthopedic and Neurosurgery demonstrates that intervention by co-management was associated with a significant decrease in medical complications [14]. We implemented many perioperative optimization approaches for the patient to avoid perioperative sever complications according to his preoperative assessment result. The surgeons and internist's together perform detailed history and examination preoperative, diagnose and optimize patient comorbidities pre and postoperative, treatment with acute medical decompensation and facilitate safe discharges. Hence, although the patient was considered highly risk for surgery because 88-year-old, obesity, increasing ASA status, multiple chronic conditions [15,16], and received a synchronous resection of three important organs, and longtime anesthesia exposure, he was recover and discharged without any severe postoperative complications. Surgeons and internists co-management approach, may maximize therapy efficiency and patient recovery.

In conclusion, RAS may become the preference operate of

synchronous resection due to advantages of minimally invasive surgery, at the same time, the SMC may serve as a potential model for delivering high-quality, efficient, and well coordinated therapy. This model may have the potential to deliver similar results in outcomes and value to other institutions.

Ethics approval

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

Source of funding

This article received no funding.

Author contribution

Lu Wenning, Meng Xiangfe: the first two authors contributed equally to this work, and writing, review and editing of the manuscript; Zhang Liping, Liu Chaoyang, Wang Rong: contributed for diagnose and treatment of the patient; Cheng Rui: responsible for the patient's therapy, follow-up, and revised the paper.

Registration of research studies

1. Name of the registry: was not required
2. Unique Identifying number or registration ID: no
3. Hyperlink to your specific registration (must be publicly accessible and will be checked): no

Guarantor

Cheng Rui was responsible for the work and the conduct of the study, had access to the data, and controlled the decision to publish.

Provenance and peer review

Not commissioned, externally peer reviewed.

Consent of the patient

Written informed consent was obtained from the patient for publication of this case report and accompanying images.

Declaration of competing interest

The authors declared no potential conflicts of interests with respect to research, authorship and/or publication of the article.

Acknowledgement

The authors thank Baoqing Jia, Xin Ma, and Rong Liu, for their insightful review of the content, and technical support.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.amsu.2021.102669>.

References

- [1] Calderwood AH, Huo D, Rubin DT. Association between colorectal and urologic cancers. *Arch. Intern. Med.* 2008 May 12;168(9):1003-1009. doi: 10.1001/archinte.168.9.1003. PMID: 18474765.
- [2] Cochetti G, Tiezzi A, Spizzirri A, Giuliani D, Rossi de Vermandois JA, Maiolino G, Coccetta M, Napolitano V, Pennetti Pennella F, Francesconi S, Mearini E. Simultaneous totally robotic rectal resection and partial nephrectomy: case report and review of literature. *Affiliations expandWorld J Surg Oncol.* 2020 May 4;18(1):86. doi: 10.1186/s12957-020-01864-1. PMID: 32366262 PMCID: PMC7199338.
- [3] Carmen Fierbințeanu-Bratică, Matthias Raspe, Alin Liviu Preda, Evija Livčane, Leonid Lazebnik, Soňa Kiňová, Evert-Jan de Kruijf, Radovan Hojs, Thomas Hanslik, Mine Durusu-Tanriover, Francesco Dentali, Xavier Corbella, Pietro Castellino, Monica Bivol, Stefano Bassetti, Vasco Barreto, Eduardo Montero Ruiz, Luis Campos et al. Medical and surgical co-management—A strategy of improving the quality and outcomes of perioperative care. *Eur. J. Intern. Med.* 2019 Mar;61:44-47. doi: 10.1016/j.ejim.2018.10.017. PMID: 30448097.
- [4] Mendez LE, Atlass J. Triple Synchronous Primary Malignancies of the Colon, Endometrium and Kidney in a Patient with Lynch Syndrome Treated via Minimally Invasive Techniques. *Gynecol Oncol Rep.* 2016 May 25;vol. 17:29-32. doi: 10.1016/j.gore.2016.05.007. PMID: 27331139; PMCID: PMC4901152.
- [5] Agha RA, Franchi T, Sohrabi C, Mathew G, Kerwan A; SCARE Group. The SCARE 2020 guideline: updating consensus surgical CAse REport (SCARE) guidelines. *Int. J. Surg.* 2020 Dec;84:226-230. doi: 10.1016/j.ijsu.2020.10.034. Epub 2020 Nov 9. PMID: 33181358.
- [6] Sahsamani G, Katikaridis I, Mikros G, Tzelepis V, Piniailidis D, Deverakis T, Dimitrakopoulos G. Chromophobe Renal Cell Carcinoma and the Synchronous Presence of Primary Colon Malignancies. Is there a relation? *Urol Case Rep.* 2017 Jun 1;14:5-7. DOI: 10.1016/j.eucr.2017.05.001. PMID: 28607876 PMCID: PMC5458091.
- [7] Davide Festi, Ada Dormi, Simona Capodicasa, Tommaso Staniscia, Adolfo-F Attili, Paola Loria, Paolo Pazzi, Giuseppe Mazzella, Claudia Sama, Enrico Roda, Antonio Colecchia. Incidence of gallstone disease in Italy: results from a multicenter, population-based Italian study (the MICOLproject). *World J. Gastroenterol.* 2008 Sep 14;14(34):5282-5289. doi: 10.3748/wjg.14.5282. PMID: 18785280 PMCID: PMC2744058.
- [8] Grigor'eva IN, Romanova TI. Gallstone disease and microbiome. *Microorganisms.* 2020 Jun 2;8(6):835. doi: 10.3390/microorganisms8060835. PMID: 32498344 PMCID: PMC7356158.
- [9] Atul Wadhwa 1, P.K Chowbey, Anil Sharma, Rajesh Khullar, Vandana Soni, Manish Bajjal, Combined procedures in laparoscopic surgery. *Surg. Laparosc. Endosc. Percutaneous Tech.* 2003 Dec;13(6):382-386. doi: 10.1097/00129689-200312000-00007. PMID: 14712100.
- [10] G.S. Choi, I.J. Park, B.M. Kang, K.H. Lim, S.H. Jun, A novel approach of robotic-assisted anterior resection with transanal or transvaginal retrieval of the specimen for colorectal cancer, *Surg. Endosc.* 23 (12) (2009) 2831–2835, <https://doi.org/10.1007/s00464-009-0484-5>. Epub. (Accessed 14 May 2009).
- [11] Tadros RO, Faries PL, Malik R, Vouyouka AG, Ting W, Dunn A, Marin ML, Briones A. The effect of a hospitalist comanagement service on vascular surgery inpatients. *J. Vasc. Surg.* 2015 Jun;61(6):1550-1555. doi: 10.1016/j.jvs.2015.01.006. PMID: 25704408.
- [12] M.T. McCurdy, S.L. Wood, Rapid response systems: identification and management of the "prearrest state", *Emerg. Med. Clin.* 30 (1) (2012) 141–152, <https://doi.org/10.1016/j.emc.2011.09.012>.
- [13] D A Story, A Shelton, D Jones, M Heland, R Belomo, Audit of co-management and critical care outreach for high risk postoperative patients (The POST audit), *Anaesth. Intensive Care.* 2013 Nov;41(6):793-798. doi: 10.1177/0310057X1304100616. PMID: 24180722.
- [14] Rohatgi N, Pooja Loftus, Olgica Grujic, Mark Cullen, Joseph Hopkins, Neera Ahuja, et al. Surgical comanagement by hospitalists improves patient outcomes: a propensity score analysis. *Ann. Surg.* 2016 Aug;264(2):275-282. doi: 10.1097/SLA.0000000000001629. PMID: 26764873.
- [15] Hui-Shan Lin, J N Watts, N M Peel, R E Hubbard. Frailty and post-operative outcomes in older surgical patients: a systematic review. *BMC Geriatr.* 2016 Aug 31;16(1):157. doi: 10.1186/s12877-016-0329-8. PMID: 27580947 PMCID: PMC5007853.
- [16] R. Mamidanna C. Stonell O. Faiz. Complications and mortality in older surgical patients in Australia and New Zealand (the REASON study): a multicentre, prospective, observational study. *Anaesthesia.* 2011 Feb;66(2):132-133. doi: 10.1111/j.1365-2044.2010.06587.x. PMID: 21254987.