Initial Experience with The "Da Vinci Robot": Robotic Splenectomy

Erşan Aygün, Ahmet Nuray Turhan, Selin Kapan, Murat Gönenç, Erkam Tülübaş

Bakirkoy Dr. Sadi Konuk Training and Research Hospital, General Surgery Clinics, İstanbul

ÖZET

Da Vinci Robotu ile ilk deneyim: robotik splenektomi

Başlangıçta ameliyat sürelerinin anlamlı olarak uzun oluşu nedeniyle robotik cerrahinin yararları konusunda hala tartışmalar olsa da minimal invazif cerrahi dönemini yaşadığımız şu günlerde prostatektomi, adrenalektomi, kolektomi veya splenektomi gibi belirli cerrahi bölgelerde önemli kolaylık sağladığı da inkar edilemez bir gerçektir. Bu olgu sunumunda splenik hidatidozu mevcut olan bir hastamıza Da Vinci robotu ile yaptığımız ilk ameliyat olan robotik splenektomiyi sunmak istedik.

Anahtar kelimeler: Robotik, splenektomi, hidatik kist, Da Vinci

ABSTRACT

Initial experience with the "da Vinci robot": robotic splenectomy

The benefits of robotic surgery are yet controversial as the length of operations at the beginning seems to be significantly longer. However, in the era of minimal invasive surgery, robotic systems provide a remarkable assistance in some specific surgical fields such as prostatectomy, adrenalectomy, colectomy or splenectomy. In this report we presented our first experience of robotic splenectomy for splenic hydatidosis.

Key words: Robotic, splenectomy, hydatid cyst, Da Vinci

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INTRODUCTION

The word "robot" was first introduced to the public by Czech writer Karel Capek in his play R.U.R. (Rossum's Universal Robots) published in 1920 (1). In the course of time, however, robots have become a technological reality, and have begun to be increasingly utilized in many scientific and industrial sections. Although robotic systems have been in use since 1994 in surgery, the da Vinci robot (Intuitive Surgicals Inc., Sunnyvale, CA) was approved by FDA for general laparoscopic operations in July 2000 (2). The da Vinci robot is currently being used in various fields such as urology, general surgery, gynecology, cardio-thoracic, and pediatric surgery (2,3).

In this report we presented a case with splenic hydatidosis, treated by robotic splenectomy reported for the first time in Turkey.

Yazışma adresi / *Address reprint requests to:* Selin Kapan
Bakirkoy Dr. Sadi Konuk Training and Research Hospital, General Surgery Clinic, Istanbul-Türkiye

Telefon / *Phone:* +90-212-414-7159

Elektronik posta adresi / *E-mail address:* selinkapan@gmail.com

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CASE REPORT

A 53 year-old female patient was admitted to our clinics with intermittent abdominal pain persisting for nine months. The patient has been taking medications (Salmeterol discus, BID) for asthma since childhood. She has had caesarean section twice and an open cholecystectomy procedure for gallstone disease fifteen, fourteen, and ten years ago, respectively. There were no abnormalities in routine biochemical test results. Combined abdominal sonography and contrast-enhanced abdominal CT demonstrated a 26x25 mm cystic mass with intensive content and peripheral calcifications in the lower pole of the spleen (Figure 1). Although the serological tests including ELISA and indirect hemagglutination were found to be negative for Echinococcus Granulosus, she was planned for splenectomy with the diagnosis of primary splenic hydatidosis. After 10 days of albendazole therapy, she had been planned for robotic splenectomy. Under general anesthesia in the right lateral decubitus position, the table was flexed and the kidney rest was raised. A pneumoperitoneum of 12 mmHg was established using a Verress needle introduced through a supraumbilical

Figure 1: CT appearance of splenic cyst


Figure 2: Trocar positioning with the robotic arms connected.

positioned on the patient's left side. Four trocars were placed for the robotic camera and instruments similar to the placements in laparoscopic splenectomy (Figure 2). The robotic arms were connected to the trocars and the dissection was performed with bipolar cautery scissors in the right hand and the Maryland forceps in the left hand. One arm of the robot was used for retraction of the spleen and the table site asistant used an extra trocar for aspiration and hemoclip application when necessary. The peritoneal attachments and splenic ligaments were divided with electrocautery and the splenic hilar vessels were disected after ligation with hemoclips. Spleen was extracted from the abdomen in an Endobag through the supraumbilical trocar site which was widened to 3 cm long. The whole length of the operation was 230 minutes with 50 minutes spent during "docking" (moveable cart and robotic arms positioning). Patient was discharged on the first postoperative day. Recovery period was uneventful. Pneumococcus vaccination was carried out on the 14th post-operative day, and albendazole treatment was ceased after 2 months postoperatively.

DISCUSSION

Although hydatic cyst is the most common cystic lesion of spleen worldwide, primary splenic hydatid disease is an uncommon clinical entity (4,5,6). Diagnosis of hydatid disease is classically made by combined radiological and serologic investigations including ultrasonography, contrast-enhanced computed tomography, ELISA, and indirect hemagglutination (7). Splenectomy was once the only treatment option for splenic hydatid cysts until the late 1900s; however, partial splenectomy or drainage are the alternative treatment modalities with conventional or laparoscopic approach (8). In our case with a nearly 3 cm in diameter hydatid cyst in a relatively small sized spleen, we preferred performing a splenectomy..

So far, minimally invasive abdominal surgery has been proven to have absolute advantages such as avoidance of an abdominal incision which has potential complications (significant post-operative pain, impairment of pulmonary function), decrease in duration of ileus, and decrease in length of post-operative stay over open abdominal surgery (9-12). The advantages of minimally invasive splenectomy in elective surgery, hematologic diseases in particular, has been well established (13,14). Robotic splenectomy offers not only the advantages of minimally invasive surgery but also some obvious advantages over conventional laparoscopic surgery (15,16,17). Moreover, robotic arms moved by the surgeon replace assistant help, providing minimal number of assistant surgeon per operation.

Although currently with longer operation time and high operational costs, robotic surgery seems to be a little disadvantageous over conventional or laparoscopic surgery, as in advanced laparoscopic surgery with more demanding learning curve with advantages of a high quality three dimensional vision to the surgeon, excellent ergonomics, tremor elimination, ambidextrous capability, motion scaling, and instruments with multiple degrees of freedom acting like the human wrist as in open surgery, classical advantages of minimal invasive surgery such as less postoperative pain, less pulmonary complications, early return to daily activities robotic surgery seems to be a promising technology in surgery.

However, it is important to identify the right indications for the use of the robot simply because of the cost factor as of today. Therefore, future larger studies are necessary for evaluation of these aspects and those results will justify the use of robotic system despite the high cost.

REFERENCES

1. Zunt D. “Who did actually invent the word “robot” and what does it mean?”. The Karel Capek website (http://capek.misto.cz/english/robot.html). Retrieved 2007-09-11.
2. Wilson EB. The evaluation of robotic general surgery. Scand J Surg 2009; 98: 125-129.
3. Anvari M, Marescaux J. Robotic Surgery: Ready for Prime time. Epublication: WeBSurg.com, Oct 2006; 6(10). URL: http://www.websurg.com/ref/doi-ed01en0020.htm.
4. Durgun V, Kapan S, Kapan M, Karabiçak I, Aydogan F, Goksoy E. Primary splenic hydatidosis. Dig Surg 2003; 20: 38-41.
5. Wani RA, Malik AA, Chowdri NA, Wani KA, Naqash SH. Primary extrahepatic abdominal hydatidosis. Int J Surg 2005, 3: 125-127.
6. Dahniya MH, Hanna RM, Ashebu S, et al. The imaging appearance of HD at some unusual sites. Br J Radiol 2001; 74: 283-289.
7. Polat P, Kantarci M, Alper F, Suma S, Koruyucu MB, Okur A. Hydatid disease from head to toe. Radiographics. 2003; 23: 475-494.
8. Culafic DM, Kerkez MD, Mijac DD, Lekic NS, Rankovic VI, Lekic DD, Dordevic ZLj. Spleen cystic echinococcosis: clinical manifestations and treatment. Scand J Gastroenterol 2010; 45: 186-190.
9. NIH Consensus Development Panel on Gallstones and Laparoscopic Cholecystectomy; Gollan JL, Bulkley JL, Diehl AM, et al. Gallstones and laparoscopic cholecystectomy. JAMA 1993; 269: 1018-1024.
10. The Southern Surgeons Club. A prospective analysis of 1518 laparoscopic cholecystectomies. N Engl J Med 1991; 324: 1073-1078.
11. McMahon AJ, Russel IT, Ramsay G, et al. Laparoscopic and minilaparotomy cholecystectomy: a randomized trial comparing postoperative pain and pulmonary function. Surgery 1994; 115: 533-539.
12. Stoker ME, Vose J, O’Mara P, Maini BS. Laparoscopic cholecystectomy: a clinical and financial analysis of 280 operations. Arch Surg 1992; 127: 589-595.
13. Winslow ER, Brunt LM. Perioperative outcomes of laparoscopic versus open splenectomy: a meta-analysis with an emphasis on complications. Surgery 2003; 134: 647-653.
14. Cordera F, Long KH, Nagorney DM, et al. Open versus laparoscopic splenectomy for idiopathic thrombocytopenic purpura: clinical and economic analysis. Surgery 2003; 134: 45-52.
15. Kim VB, Chapman WH, Albrecht RJ, et al. Early experience with telemanipulative robot-assisted laparoscopic cholecystectomy using da Vinci. Surg Laparosc Endosc Percutan Tech 2002; 12: 33-40.
16. Merola S, Weber P, Wasielewski A, Ballantyne GH. Comparison of laparoscopic colectomy with and without the aid of a robotic camera holder. Surg Laparosc Endosc Percutan Tech 2002; 1: 46-51.
17. Stylopoulos N, Rattner D. Robotics and ergonomics. Surg Clin North Am 2003; 6: 1321-1337.