

Drainage of Giant Liver Abscess by Robotic Surgery: Case Report

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ABSTRACT

Introduction: The robot-assisted surgery system has overcome some technical bottlenecks of laparoscopy and dramatically improves the flexibility and precision of liver operation. It can also provide the magnified field of surgery and the three-dimensional view, facilitating intracorporeal sutures and visualization of delicate

tissue anatomy. However, several limitations, such as the robot's high cost and high failure rate, prevent its popularization. **Clinical Case:** She has admitted a 54-year-old female via the emergency room due to abdominal pain and a liver cyst. He began two weeks prior to admission with intense pain located in the right hypochondrium irradiating towards the contralateral hypochondrium; he went to a private doctor who told him to perform a UDG of the abdomen in which the presence of a liver cyst, which is why go to this hospital. An abdominal tomography was performed, which reported: an ovoid, hypodense image with slightly lobed and well-defined edges, which measures 8.7 x 16.4 x 9.9 cm in its principal axes with an approximate volume of 738 mL and located in segments VI, VII, and VIII; It presents a wall with a thickness of up to 14 mm, which presents moderate and heterogeneous enhancement after the passage of the contrast medium; dilatation of the intrahepatic bile duct up to 7.6 mm. **Discussion:** Robotic surgery is superior to conventional laparoscopic surgery in various complex surgical procedures. For example, in radical prostatectomy, the robotic approach has been associated with an earlier return of sexual function compared with conventional laparoscopic surgery, attributed to a more remarkable ability to preserve the cavernous nerve. **Conclusion:** Drainage of a giant liver abscess has not been reported to date resolved by robotic surgery.

Keywords: Robotic, Laparoscopic, Liver Surgery, Operative surgical procedure, Giant liver abscess.

INTRODUCTION

Laparoscopic liver surgery has evolved significantly over the past decade. Increased understanding of liver anatomy and technological advances has expanded the scope of the minimally invasive approach. Robot-assisted technology offers solutions to the fundamental limitations of conventional laparoscopic liver resection. Several centers have begun to use robotic technology to perform complex liver surgeries.

Segmentectomy/wedge (36%) was the most common resection performed, followed by left lateral sectionectomy (28%), right hepatectomy (16%), and left hepatectomy (9%). Based on the first published series analysis, robotic liver surgery is a feasible and safe tool for minimally invasive resection of liver lesions (1).

Although minimally invasive liver surgery has shown reduced morbidity in selected patients, conventional laparoscopic liver resection has inherent limitations with reduced freedom of movement within the abdominal cavity and a two-dimensional view of the operative field. Robotic liver surgery allows surgeons to perform advanced procedures with the potential for improved precision, ergonomics, and a three-dimensional view of the surgical site. However, using the robot involves a steep learning curve and additional equipment (2).

The robot-assisted surgery system has overcome some technical bottlenecks of laparoscopy and dramatically improves the flexibility and precision of liver operation. It can also provide the magnified field of surgery and the three-dimensional view, facilitating intracorporeal sutures and visualization of delicate tissue anatomy. However, several limitations prevent its popularization, such as the robot's high cost and high failure rate (3).

CLINICAL CASE

We admitted a 54-year-old female via the emergency room due to abdominal pain and a liver cyst. He began two weeks prior to admission with intense pain located in the right hypochondrium irradiating towards the contralateral hypochondrium; he went to a private doctor who told him to perform a UDG of the abdomen in which the presence of a liver cyst, which is why go to this hospital. On admission, she has an icteric tinge of conjunctivae, a globose abdomen at the expense of the adipose panniculus, and peristalsis present, painful on palpation in the right hypochondrium, without other relevant alterations and laboratories with a slight elevation of bilirubin at the expense of the indirect, without other alterations. An abdominal tomography was performed, which reported: an ovoid, hypodense image with slightly lobed and well-defined edges, which measures 8.7 x 16.4 x 9.9 cm in its principal axes with an approximate volume of 738 cc and is located in segments vi, vii, and saw; It presents a wall with a thickness of up to 14 mm, which presents moderate and heterogeneous enhancement after the passage of the contrast medium; dilatation of the intrahepatic bile duct up to 7.6 mm.



Figure 1: Hepatic cyst measuring 8.7 x 16.4 x 9.9 cm in its principal axes with an approximate volume of 738 cc, located in segments VI, VII and VIII.

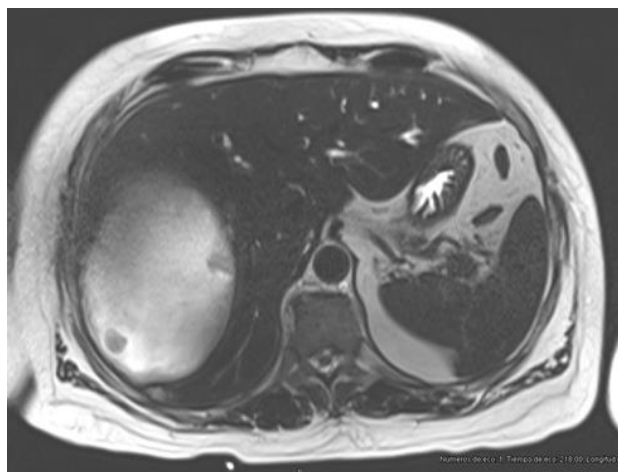


Figure 2: Magnetic resonance. Axial section showing an image in segments VII and VIII rounded with partially defined edges at the expense of loss of continuity at the level of the anteromedial and anterolateral border with a hyperintense laminar image adjacent to the wall.

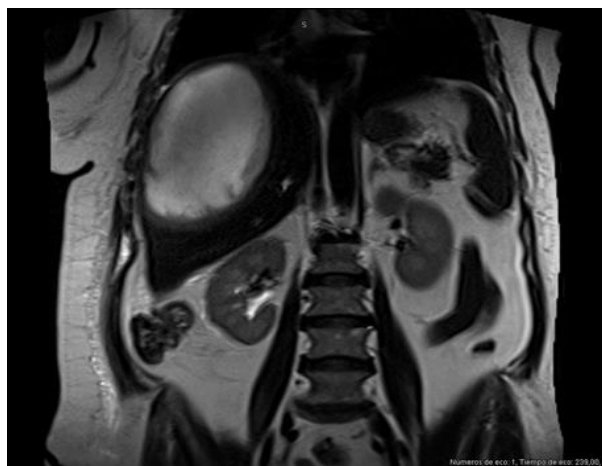


Figure 3: Coronal section of an abscessed liver cyst with probable rupture.

Due to the complexity of the case, derived from the patient's surgical history and given the availability of the resource, it decided to perform a da Vinci robot-assisted intervention; a hepatic cyst was identified, a puncture and aspiration of the purulent content was performed, later the cyst was unroofed, the cyst wall was widely excised and removed, the cavity washed with warm water, Drainage placed, the cavity of the cyst inspected to rule out the presence of bile, ruling out the existence of communication with the bile duct.



Figure 4: Puncture and aspiration of purulent content.



Figures 5 and 6: Unroofing of liver cyst. The cyst wall is extensively excised.



Figure 7: The surgeon placed a drain in the liver bed.

The patient had a favorable post-surgical evolution with targeted antibiotic therapy. She remained afebrile and tolerated the oral route; on the third day, with minimal schematic output in the Drainage, she underwent a control tomography and was discharged home.

DISCUSSION

The da Vinci Surgical System was introduced in the 1990s to overcome the limitations of conventional laparoscopic surgery. Based on a high-resolution three-dimensional image with seven-degree-of-freedom instruments, a hand-shake can filter through the operating robotic arms—an explosion in the number of robotic liver resections (RLR) being performed due to these theoretical benefits. Although several RLR series have been published, there needs to be more evidence that it provides a superior result compared to LLR. The use of RLR is still relatively new, and the indications for its application remain controversial.

Hepatectomy is one of the most effective treatments for treating liver tumors. Since the first laparoscopic hepatectomy reported by Reich et al. in 1991, laparoscopic liver resection has been widely used for benign and malignant liver diseases. In 2008, a consensus conference on conventional laparoscopic liver resection was held in Louisville with indications for lateral liver resections and left minor resections (benign tumors 5 cm, malignant tumors 3 cm) over Antero-peripheral segments. With the improvement of the technique, left lateral resection is recommended as a standard procedure and can be reached all liver segments. Some studies have compared LLR with open liver resection (OLR), evidencing a significant decrease in blood loss, a lower rate of complications, and a reduction in hospital stay; these two procedures are comparable regarding safety and pathology results (4). However, no robotic surgery procedures described in this article have been reported.

In the last decade, robotic surgery has emerged as a potentially valid alternative to conventional laparoscopic surgery. Advantages of robotic surgery include 3D visualization of the surgical field and improved instrument dexterity that can facilitate dissections and surgical reconstructions. In addition, using an ergonomic surgical console can reduce surgeon fatigue during long and complex procedures and easier control of bleeding, two reasons why the laparoscopic approach remains unpopular for major resections (5, 6). Properly all the abdominal cavity organs are susceptible to being treated by robotic surgery, such as benign duodenal and periampullary tumors. These rare lesions require careful attention due to their

complex anatomical relationships with the major and minor papillae and the exit stomach during surgery. Although endoscopy is less invasive than open resection, many lesions are not amenable to endoscopic removal. Robotic surgery offers technical advantages over traditional laparoscopy and has demonstrated the safety and feasibility of this approach for various duodenal injuries (7).

On the other hand, total excision of the mesorectum (TMD) is the standard surgical treatment for curing radical resection of rectal cancers. Minimally invasive TME has been gaining ground, favored by continuous technological advances. New procedures, such as transanal TME (TAT TME), have been introduced to overcome some technical limitations, especially in tumors of the lower rectum, obese patients, or patients with a narrow pelvis. Early reports of Ta TME showed promising results compared to conventional laparoscopic TME. However, recent publications raised concerns regarding the high rates of anastomotic leaks or local recurrences observed in some series. Robotic TME Ta has been proposed as a new technique that incorporates the potential benefits of a perineal dissection along with precise control of distal margins and also offers all those advantages provided by robotic technology in terms of improved precision and dexterity (8).

Robotic surgery is superior to conventional laparoscopic surgery in various complex surgical procedures. For example, in radical prostatectomy, the robotic approach has been associated with an earlier return of sexual function compared with conventional laparoscopic surgery, attributed to a more remarkable ability to preserve the cavernous nerve. A similar reduction in impotence rates has been reported with robotic rectal surgery, presumably for similar reasons. Distal pancreatectomy treats benign and malignant lesions (e.g., pancreatic cancer, neuroendocrine tumors, cystic lesions, chronic pancreatitis) involving the body and tail of the pancreas. However, again acceptance has still been slow (9). **CONCLUSION.** We did not find any reference to the surgical procedure performed by us with robotic surgery, and the Drainage of a giant liver abscess has not been reported to date resolved by robotic surgery.

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