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CASE REPORT
Cosmetic

Simultaneous Robot-assisted Lipoabdominoplasty and Cholecystectomy

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Summary: In the current era of advanced technologies, robotic surgery is rapidly evolving. New articles are emerging on the use of robots in general surgery, urology, and oncology, with single cases in maxillofacial surgery. In this article, we describe the successful use of robotic techniques for simultaneously performing suturing repair of the diastasis of the rectus abdominis muscles, aesthetic correction of the anterior abdominal wall with lipoabdominoplasty, and cholecystectomy. That, according to our knowledge, has not ever been done before. *(Plast Reconstr Surg Glob Open 2024; 12:e6249; doi: 10.1097/GOX.0000000000006249; Published online 15 October 2024.)*

Robotic surgery is expanding its applications into new surgical areas as technology advances.[1–4] New articles are emerging on the use of robots in general surgery, urology, oncology, and specific observations in maxillofacial surgery.[5–7] There are initial articles on miniabdominoplasty and combined robot-assisted operations for simultaneous removal of benign formations and neck lifting.[4,8,9]

The outcomes of a series of robotic operations are limited by an insufficient number of observations.[10] Despite the drawbacks of the high cost of consumable materials and the necessity for specialized training, combined operations justify the therapeutic effect with a pronounced aesthetic outcome and patient satisfaction without additional incisions.[10,11]

We have performed a combined robotic surgery for the correction of the diastasis of the rectus abdominis muscles with aesthetic lipoabdominoplasty and treatment of chronic calculous cholecystitis with cholecystectomy, which, according to our knowledge, has not ever been done before.

CLINICAL CASE

Patient A

A 34-year-old woman with body mass index of 27 kg/m^2 was diagnosed with excessive fat deposits in the anterior abdominal wall and lumbar region, abdominal ptosis, and diastasis of the rectus abdominis muscles.

During the preoperative examination, gallstones up to 8 mm in size were identified in the gallbladder. Detailed history taking revealed complaints of periodic burning sensations, heaviness, pain in the right hypochondrium, and heartburn. The patient was consulted by an abdominal surgeon, who made an accompanying diagnosis: cholelithiasis and calculous cholecystitis. It was decided to perform a combined robot-assisted surgery: lipoabdominoplasty with suture repair of the diastasis of the linea alba and cholecystectomy (Fig. 1). The following surgical steps are outlined:

1. Docking layout within the bounds of the anticipated excised flap. (**See figure, Supplemental Digital Content 1,** which describes the docking layout within the bounds of the anticipated excised flap. **http://links.lww.com/PRSGO/D573**.)
2. Surgical protocol. Commencement of work by the first team of plastic surgeons.
   a. Liposuction of the anterior abdominal surface and lumbar regions, 4.5 L aspirated.
   b. Installation of the ports above the fascia in the layer between the subcutaneous tissue and the anterior rectus fascia as well as the introduction of robotic arms systems (Fig. 2).

   The final clamp was placed on the right, 8 cm from the navel along the planned line of excision for the skin and fat flap. A 30-degree camera was positioned on the right at the level of the navel, and a Maryland

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Written informed consent has been obtained from the patients to publish this article.

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Related Digital Media are available in the full-text version of the article on www.PRSGlobalOpen.com.

Fig. 1. Photograph of the patient before the surgery.

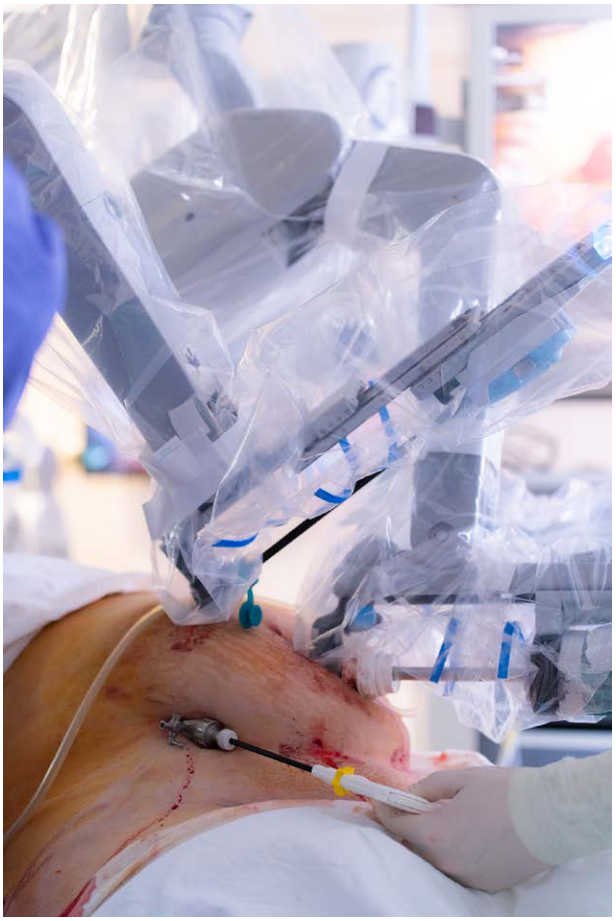

Fig. 2. Docking.

clamp was placed on the left, 8 cm from the navel along the planned line of excision for the cutaneous-subcutaneous flap.

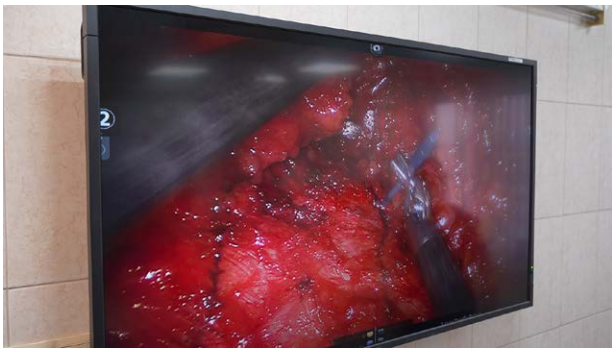

Fig. 3. Marking and suturing of the diastasis of the rectus abdominis muscles.

3. Dissection of the cutaneous-subcutaneous flap cranially to the level of the xiphoid process with a constriction zone above the navel while preserving the perforators, corridor 10 cm.
4. Change of surgical teams. Commencement of work by the second team of abdominal surgeons.
   Repositioning of the robot's arms for work on the gallbladder. Due to the mobility of the skin fat flap, for convenient access and work on the gallbladder and surrounding tissues, subcutaneous ports were shifted and introduced through the muscle layer into the abdominal cavity in a more cranial position. Skin entry points were maintained according to the markings.
5. Cholecystectomy.
   The stage of simultaneous cholecystectomy began with the placement of optical and working ports. For additional traction of the gallbladder, a 5-mm trocar was placed along the anterior axillary line in the right mesogastrium. Due to the increased mobility of the cutaneous-subcutaneous flap of the anterior abdominal wall that appeared after the first stage of the operation, trocar incisions were made at the level of the skin fat flap, according to preoperative marking, which was then planned to be removed during abdominoplasty.
   After completion of docking and revision of the abdominal cavity using monopolar coagulation (Permanent Cautery Hook), the cystic duct and cystic artery were sequentially identified, and the lower third of the gallbladder bed was mobilized. The criteria of the "critical view of safety for cholecystectomy" concept were observed. Cholecystectomy was performed, and the gallbladder was extracted through the site where the optical trocar was placed. (**See figure, Supplemental Digital Content 2**, which displays cystic duct dissection. **http://links.lww.com/PRSGO/D574**.)
6. Switching of surgical teams. Resumption of work by the plastic surgery team.
   Marking and suturing of the diastasis of the rectus abdominis muscles were performed with individual Z-shaped stitches using Ethibond 0-0 suture and a continuous suture with PDS 1-0 (Fig. 3).
7. Excision of the cutaneous-subcutaneous flap. The weight of the flap was 2.5 kg. Layered suturing of the wound was performed with edge adaptation of the flap and application of sutures using Vicryl 2-0, Vicryl

Fig. 4. Photograph of the patient 3 weeks after the surgery.

3-0, and Monocryl 4-0. The wound was drained using active vacuum drains from the Unovaq system, with a diameter of 4 mm. According to the preliminary markings, a neoumbilicus was formed.

CONCLUSIONS

The authors have reportedly conducted the world's first-known combined robotic aesthetic and intraabdominal surgery for treating abdominal organ pathology and aesthetic correction of the anterior abdominal wall.

The advantage of this procedure is the ability to place ports at alternate locations from the traditional laparoscopic port sites without compromising visibility and instrument maneuverability. A combined operation will change the wound class to clean-contaminated and slightly increase the risk of infection. However, this risk must be estimated against the likelihood of needing a cholecystectomy in the future, which can disturb the abdominal wall. Furthermore, a combined operation increases the risk of thromboembolism, which can be lowered by following the standard preventative measures.

The classical lipoabdominoplasty with meticulous liposculpture increased the mobility of the tissue flap and provided the shift and expansion of the range of motion of the robot's arms for the abdominal phase, and the excision of the cutaneous-subcutaneous flap concealed all access tracks to the abdominal cavity and achieved a maximally pronounced aesthetic result (Fig. 4). We are confident that this is just the initial phase of collaboration between robotic surgery and aesthetic plastic surgery.

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DISCLOSURE

The authors have no financial interest to declare in relation to the content of this article.

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