A case of breast surgery with da vinci si robotics

Chen Kuo[1], http://orcid.org/0000-0003-0095-8545, Sukortseva N.S.[1], http://orcid.org/0000-0002-7704-1658, Sinelnikov M.E.[1], http://orcid.org/0000-0002-0862-6011, Nassilevsky P.A.[2], http://orcid.org/0000-0001-6747-0056, Reshetov I.V.[1] http://orcid.org/0000-0002-0580-7052

[1]I.M. Sechenov First Moscow State Medical University
[2]Institute of advanced Studies of the Federal Medical and Biological Agency of Russia
*corresponding author: Chen Kuo, I.M. Sechenov First Moscow State Medical University. Email: chenkchenk@foxmail.com

Abstract

Objective: To explore the clinical efficacy of da Vinci Si robotics assisted axillary lymph node dissection in breast cancer patients, and provide a novel alternative approach for doctors and patients.

Methods: A 56-year-old female patient with breast cancer was admitted to our hospital in September 2018. Under general anesthesia, modified radical mastectomy of the right breast and da Vinci Si robotics assisted right axillary lymph node dissection were performed. The wound healing, complications, aesthetic effect and patient's satisfaction were evaluated after surgery.

Results: The patient recovered well after surgery, with no complication occurs. The incision was not obvious, without any significant haematoma or other complications. The aesthetic effect was good. During three months of follow-up, the patient's satisfaction degree was high.

Conclusion: Compared with traditional open surgery, da Vinci Si robotics assisted breast surgery has better aesthetic effect. Compared with traditional endoscopy surgery, da Vinci Si robotics assisted breast surgery can provide high-definition three-dimensional surgical view as well as more accurate operative procedures. Therefore, it must be the new tendency of surgery in the future and gain clinical popularity and application.

Keywords: da Vinci Si surgical system, Breast cancer, lymphadenectomy, videoendoscopic

Resumen

Resumen: Objetivo: Explorar la eficacia clínica de la disección de ganglios linfáticos axilares asistidos por da Vinci Si en pacientes con cáncer de mama y proporcionar un nuevo enfoque alternativo para médicos y pacientes.

Métodos: Una paciente de 56 años de edad con cáncer de mama ingresó en nuestro hospital en septiembre de 2018. Bajo anestesia general, se realizó una mastectomía radical modificada de la mama derecha y robótica da Vinci Si asistida por disección de ganglios linfáticos axilares derechos. Bajo anestesia general, se realizó una mastectomía radical modificada de la mama derecha, así como la disección de los ganglios linfáticos axilares derechos por medio del sistema quirúrgico robótico Da Vinci Si. La cicatrización de la herida, las complicaciones, el efecto estético y la satisfacción del paciente se evaluaron después de la cirugía.

Resultados: El paciente se recuperó bien después de la cirugía, sin que se produjera complicación. La incisión no fue obvia, sin hematoma u otras complicaciones significativas. El efecto estético era bueno. Durante tres meses de seguimiento, el grado de satisfacción del paciente fue alto.

Conclusión: en comparación con la cirugía abierta tradicional, la cirugía de senos asistida por robótica da Vinci Si tiene un mejor efecto estético. En comparación con la cirugía endoscópica tradicional, la cirugía asistida de senos asistida por robótica da Vinci Si puede proporcionar una vista visión quirúrgica tridimensional de alta definición, así como procedimientos quirúrgicos más precisos. Por lo tanto, debe debería ser la nueva tendencia de la cirugía en el futuro y ganar popularidad y aplicación clínica.

Palabras clave: sistema quirúrgico da Vinci Si, cáncer de mama, linfadenectomía, videoendoscópica.

www.revhipertension.com

Revista Latinoamericana de Hipertensión. Vol. 14 - N° 1, 2019

Breast cancer is one of the most common clinical malignant tumor. With the progression of the disease, it is pretty easy for the cancer cells to exfoliate and invade important organs like the heart and liver through blood or lymphatic circulation, seriously threatening the patient's life[1]. At present, surgery is the main approach for breast cancer treatment. And endoscopy surgery is a leap in the mini-invasion breast surgery. However, da Vinci robotics has carried this mini-invasive trend to a new height. As an important breakthrough in the 21st century minimally invasive surgery technique, da Vinci Si surgical system can provide high-definition, three-dimensional and microscopic surgical view. The accurate and flexible mechanical arm could operate precisely within minimal incision. It could reach into the narrow surgical site and accomplish every kind of surgery safely and effectively[2] (Fig. 1). However, in the field of breast surgery, robotics assisted surgery is at an early stage. In September 2018, our hospital had accomplished the first case of da Vinci Si robotics assisted breast surgery, which reported as follows.

Fig.1. General view of da Vinci Si surgical system with flexible mechanical arms

Data and Method: Clinical data: Patient - female, 56 years old. Breast examination: the breasts were symmetry, without any nipple retraction, discharge or apparent dimple sign and orange peel changes. There was no local redness, swelling or ulceration. A firm mass was touched 3 cm from the right nipple, at the direction of three o'clock, with a size of 3.7 cm* 2.4 cm. No tenderness was complaint. The boundary of the mass was not clear, with poor mobility. No mass was touched in the left breast. No enlarged lymph node was touched in both sides of armpit. Breast MRI showed: lesion in the upper inner quadrant of the right breast, which is likely be breast cancer. Biopsy and pathological examination of the mass of the right breast showed: right invasive breast cancer. Immuno-histochemcal staining showed: ER (-), PR(-), HER2/neu(+), Ki67(20%). After consulting with the patient, we decided to perform modified radical mastectomy of the right breast with retention of the nipple and da Vinci Si robotics assisted right axillary lymph node dissection.

Surgical method: The patient was subjected to general anesthesia with a double-lumen endotracheal intubation and placed at supine position. The right side of back was elevated, and the right upper extremity was abducted by 90°. The body was marked on its surface, convention disinfection was performed with iodophor, and the sterile towel was placed. A 5cm-long crescent-shaped incision was made in the peripheral quadrant of the areola at 3 o'clock. An electric knife was used for sharp separation in the subcutaneous space until 3cm away from the tumor edge, and then the tumor surrounded by normal gland was completely dissected (Fig. 2, a). A 7 cm incision was made in the right armpit as the assess of da Vinci Si surgical system. The Arm One was linked to the ultrasonic knife, while Arm Two was connected to the grasping forceps (Fig. 2b). First, the underarm fat was free. With the help of the robotics high-definition amplification system and its precise operation, we used the forceps to pull the lymph nodes and the ultrasonic knife to condense the tissue and small blood vessels around the lymph nodes. Finally, the subclavial, submental, and subvertebral lymph nodes were removed (Fig. 2 c,d). The ultrasonic knife was used to stop bleeding. When there was no bleeding in the wound, we flushed it before removing the robotics. The incision was closed layer by layer, the drainage tube was placed, and the incision was pressure-wrapped (Fig. 2, e).

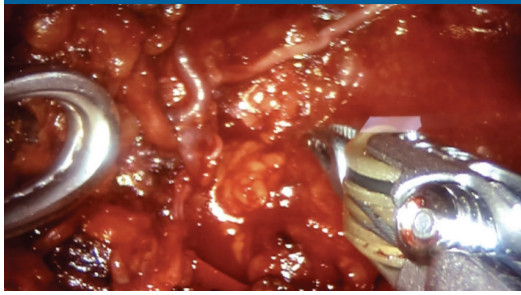**Fig. 2. Stages (a – e) of breast surgery using a da Vinci Si surgical system**
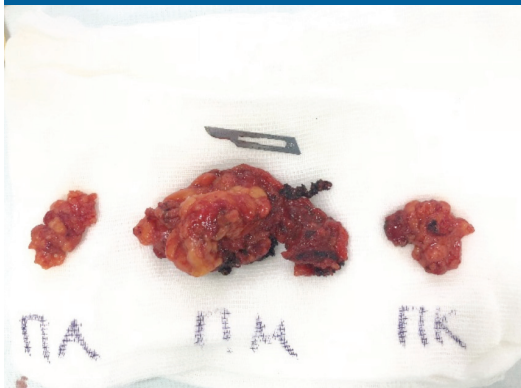

Fig. 2B

Fig. 2C

Fig. 2D

Fig. 2E

Results

ndicators associated with surgery: Axillary lymph node dissection was performed with the help of da Vinci Si robotics, with no elongation or addition of incision. The blood loss was 10ml. The total surgical time was 50min. Of those, the modified radical mastectomy of the right breast with retention of nipple took 20min, da Vinci Si robotics assisted axillary lymph node dissection took 20min, and robotics manipulation took 10min.

Complications: The follow-up time was three months. There was no post-operative complications like wound infection, fat liquefaction, lymphedema of the upper limbs, etc. Local recurrence or metastasis was not noticed.

Aesthetic effect and patient's satisfaction: The patient recovered well after surgery. The incision was not obvious, without any significant hematoma or other complications. The aesthetic effect was good. During three months of follow-up, the patient's satisfaction degree was high.

Discussion: As Friedlander et al.[3] applied surgical endoscopy technique in breast disease treatment in recent years, breast cancer surgery is heading towards mini-invasion. Endoscopy assisted breast cancer surgery guarantee both aesthetic effects and long-term therapeutic safety[4]. Nowadays, da Vinci Si surgical system has been widely applied in departments like urinary surgery, gynecology, thyroid surgery and the like[5-7]. According to the report of Toesca[8], Chung[9], Selber et al.[10], robotics assisted latissimus dorsi and beast reconstruction can achieve significant results, without severe complications. And the patient's satisfaction degree was high. Relevant researches had reported that da Vinci Si robotics could be used in male mastectomy and internal mammary node biopsy[11-13]. In addition, da Vinci Si surgical system can provide clearer three-dimensional surgical view. With the help of stable and flexible mechanical arm, it operates more precisely and has lower complication rates, which is gradually accepted in more clinical doctors.

In this case of da Vinci Si surgical system assisted axillary lymph node dissection in breast cancer patient, our understandings are listed as follows: ① Design of incision: The incision should both be suitable for the placement of mechanical arms and satisfying the aesthetic requirement. Therefore, it is of great importance to design it properly, a 5-7cm incision was adopted in this surgery, which is convenient to remove lymph nodes sample as well as could reduce the operation time and satisfy the aesthetic demands. ② Surgical view: The high-definition, three-dimensional imaging system could precisely indentify the blood vessels, lymph nodes and the like. We could use grasping forceps and ultrasound knife to dissect the corresponding lymph nodes. ③ Safety: Due to the clear surgical view, we totally avoid the damage to blood vessels and nerves. With small incision, the patient recovered quickly after surgery, with low incidence of severe complications.

To sum up, though the expense of da Vinci Si robotics assisted surgery is relatively high, it has advantages including clear surgical view, simple and flexible operation, less trauma and low complication rate. Therefore, the patient's post-operative recovery is rather fast, with satisfactory aesthetic effects and high satisfaction degree. This technique is safe and reliable, which will be more popularized in the future.

References

Sağ, S., Nas, Ö. F., Öztürk, A., Yeşilbursa, D., & Erdoğan, C. (2017). Bilateral perirenal fluid accumulation associated with tetralogy of fallot. European Journal of General Medicine, 14(3).

Larkin M. Transatlantic, robot-assisted telesurgery deemed a success. Lancet, 2001, 358(9287):1074.

www.revhipertension.com

Revista Latinoamericana de Hipertensión. Vol. 14 - Nº 1, 2019

Friedlander L.D., Sundin J., Bakshandeh N. Endoscopy mastectomy and breast reconstruction: endoscopic breast surgery. Aesthetic Plast. Surg., 1995, 19(1):27-29.

Soybir G., Fukuma E. Endoscopy assisted oncoplastic breast surgery. J. Breast Health, 2015, 11(2):52-58.

Gratzke C., Dovey Z., et al. Early catheter removal after robot-assisted radical prostatectomy: surgical technique and outcomes for the last technique. Eur. Urol, 2016, 69(5):917-923.

Krause A.K., Muntz H.G., Megonigle K.F. Robotic-assisted gynecologic surgery and perioperative morbidity in elderly women. Minim Invasive Gynecol, 2016(16):1553-4650.

Kahveci R, Eruyar E, Küçük EÖ, Yüksek YN, Tütüncü T, Aksoy H, et al. Retrospective Analysis of Multiple Sclerosis Patient Records in a Turkish reference Center. J Clin Exp Invest. 2017;8(3):96-100. https://doi.org/10.5799/jcei.343199

Toesca A., Peradze N., Manconi A. et al. Robotic nipple sparing mastectomy for the treatment of breast cancer: Feasibility and safety study. Breast. 2017,31:51.

Chung J.H., You H.J., Kim H.S, et al. A novel technique forrobot assisted latissimus dorsi flap harvest. J. Plast. Reconstr. Aesthet. Surg. 2015, 68(7):966-972.

Selber J.C., Baumann D.P., Holsinger F.C. Robotic latissimus dorsi muscle harvest case series. Plast Reconstr. Surg, 2012, 129(6):1305-1312.

Deng F., Li H. Da Vinci Robotic assisted report of 2 cases of breast surgery. Acta Un. Med. Nanjing, 2018, 38(06): 860-862.

He Q., Yu F. et al. Robotic subcutaneous mastectomy for gynecomastia: a case report.Chin. J. Endocr. Surg. 2016, 10(2):181-183.

Melly L., Jansens J.L., Kalscheuer G. Robotic lymphadenectomy of an internal mammary lymph node metastasis. Acta Chir Belg, 2017, 15(1):1-2.

73