

THE ROLE OF THE LAPAROSCOPY IN OVARIAN CANCER TREATMENT

MARIO PULJIZ¹, LUCIJA KOSTIĆ¹, KRUNOSLAV CINDRIĆ², ILIJA ALVIR¹,
IVICA MAMIĆ¹, DAMIR DANOLIĆ¹ and DARKO TOMICA³

¹Department of Gynecologic Oncology, University Hospital for Tumors,
University Hospital Center Sestre milosrdnice, Zagreb, Croatia;

²Department of Gynecology and Obstetrics, General Hospital Ogulin, Ogulin, Croatia;

³Department of Gynecology and Obstetrics, General Hospital Scheibbs, Scheibbs, Austria

Summary

Laparoscopy is usually undertaken in young women with adnexal disease that is believed to be benign, but found to be malignant at surgery. Some surgeons use laparoscopy for staging, but mainly for presumed stage I or II ovarian cancer. Also, laparoscopy can be useful for selecting women who can be optimally debulked at primary surgery. There are some concerns about using laparoscopic approach in women with ovarian cancer: port-site metastasis, possibility of intraoperative rupture of tumor and effect of pneumoperitoneum. Studies showed that rate of port-site metastasis after laparoscopic surgery in women with ovarian cancer is low and usually occurs when there is peritoneal carcinomatosis or distant metastatic disease. Also, it seems that laparoscopy with CO₂ pneumoperitoneum does not reduce the overall survival in women with intraabdominal metastases. Preoperative rupture, surface capsular invasion and positive peritoneal cytology are more relevant in terms of prognosis than intraoperative rupture, but further research is needed. Conventional laparoscopy and robotic-assisted laparoscopy are comparable in both early and advanced disease. These approaches are not inferior to laparotomy and they are acceptable access in selected patients.

KEY WORDS: *laparoscopy, ovarian cancer, adnexal mass*

ULOGA LAPAROSKOPIJE U LIJEČENJU RAKA JAJNIKA

Sažetak

Laparoskopija se najčešće koristi kod žena za koje se mislilo da imaju benignu bolest, ali se tijekom operacije ispostavilo da se radi o malignoj bolesti. Neki kirurzi koriste laparoskopski pristup za stupnjevanje bolesti i to najčešće za pretpostavljeni I ili II stadij. Također, laparoskopija može biti korisna za odabir žena kojima se može primarno napraviti „debulking“. Postoji nekoliko briga prilikom korištenja laparoskopskog pristupa: pojava metastaza na mjestu ulaska troakara, mogućnost intraoperacijske rupture tumora i učinak pneumoperitoneuma. Studije su pokazale da je udio metastaza na mjestu ulaska troakara nizak i da se najčešće javlja kod žena koje imaju karcinomatozu peritoneuma i udaljene metastaze. Također, čini se da laparoskopija s CO₂ pneumoperitoneumom ne smanjuje ukupno preživljenje žena s intraabdominalnim metastazama. Preoperacijska ruptura, površinska invazija kapsule i pozitivan peritonealni ispirak su važniji za prognozu od intraoperacijske ruptуре, no daljnja istraživanja su potrebna. Konvencionalna i laparoskopija pomoću robota su usporedive i u ranoj i u proširenoj bolesti. Ovi pristupi nisu inferiorni laparotomiji i prihvatljivi su kod odabranih pacijenata.

KLJUČNE RIJEČI: *laparoskopija, rak jajnika, adneksalna masa*

INTRODUCTION

An adnexal mass can be found in women of all ages. It can be discovered on routine pelvic examination or because of pelvic pain, pressure or any other symptom. The biggest concern is the possibility that it is malignant. In premenopausal women the overall risk of malignancy of adnexal mass is 6 to 11 percent and 29 to 35 percent in postmenopausal women (1). Suspicion of malignancy of an adnexal mass is the appearance of the mass on imaging study. Society of Radiologists in Ultrasound (SRU) indicated that transvaginal ultrasound is better technique for imaging and characterizing an adnexal mass than a transabdominal ultrasound (2). Some ultrasound morphology are associated with malignancy, like a solid component or nodularity, color Doppler positive flow in the solid component and septations (>2 to 3 mm). Pelvic ultrasound has 86 to 91 percent sensitivity for the diagnosis of ovarian cancer and the specificity ranged from 68 to 83 percent (3).

SURGICAL TREATMENT

For woman with suspicious mass, surgical evaluation is the standard approach because ovarian cancer can not be diagnosed with noninvasive technique. Many women undergoing surgery for a benign mass because of this approach. Buys SS et al. (4) showed in their large randomized trial that among 570 women who underwent surgical evaluation for suspected ovarian cancer, 20 cases of malignancy were found. However, the risk for failing to diagnose ovarian cancer must be weighed against the potential morbidity of surgery.

LAPAROSCOPY IN OVARIAN CANCER TREATMENT

Laparoscopy is usually undertaken in young women with adnexal disease that is believed to be benign, but found to be malignant at surgery. Some surgeons use laparoscopy for staging, but mainly for presumed stage I or II ovarian cancer. Park HJ et al. (5) founded no difference between laparoscopy and laparotomy in operative duration in women with presumed stage I or II ovarian cancer. Except the fact that laparoscopic surgery was associated with less blood loss. Only 3.7 per-

cent was converted in to laparotomy. Also, laparoscopy can be useful for selecting women who can be optimally debulked at primary surgery. Fagotti et al. (6,7) investigated the role of laparoscopy in predicting optimal cytoreduction in patients with advanced ovarian cancer. In their study, 113 women with a preoperative diagnosis of stage III or IV ovarian cancer underwent diagnostic laparoscopy followed by laparotomy with staging and cytoreduction (6). Some features like omental cake, peritoneal and diaphragmatic carcinosis, bowel and stomach infiltration, spleen and liver metastasis can be discovered by diagnostic laparoscopy and predict whether optimal cytoreduction could be accomplished. Because surfaces cannot be palpated laparoscopically, question is whether the pelvis and abdomen can be examined as closely as with an open surgery. Data from some studies proposed that the stage assigned laparoscopically does not vary from laparotomy (8, 9).

Another concern by using a laparoscopy approach to remove a suspicious adnexal mass is fear of rupture of tumor capsule and dissemination of malignant cells. Performing oophorectomy rather than a cystectomy, if ovarian cancer is suspected, and use of a laparoscopic bag is the best way to avoid an intraperitoneal spillage (10). Copious irrigation should be performed if rupture happens. How rupture of an ovarian capsule affects on prognosis is arguable (11,12). The possible mechanism of dissemination of malignant cells after rupture is through the peritoneal circulation (13). Preoperative rupture, surface capsular invasion and positive peritoneal cytology are more relevant in terms of prognosis than intraoperative rupture, but further research is needed. Kim HS et al. (14) found a significantly worse progression-free survival related with preoperative extracapsular disease compared with intraoperative rupture or no rupture in few studies that included only women with complete surgical staging and adjuvant chemotherapy. Bakkum-Gamez JN et al. (15) showed that intraoperative capsule rupture and positive cytologic washings are predictors of worse disease-free survival. Also, intraoperative capsule rupture announce a higher risk of disease recurrence. However, still is not clear whether worse prognosis related with intraoperative rupture is due to rupture or to a missed diagnosis of advanced disease in incompletely staged women.

Other concern for using laparoscopy as a method in women with malignant disease is port site metastasis. The rate of port-site metastasis after laparoscopic surgery in women with ovarian cancer is low and usually occurs when there is peritoneal carcinomatosis or distant metastatic disease (16). Because of that, Zivanovic O et al. (16) considered that port-site tumor implantation should not be used as an argument against laparoscopic approach in treatment of ovarian cancer. Some other studies disagree. Morice P et al. (17) proposed to avoid port-site metastasis and so women with an evidently malignant ovarian tumor should not be treated laparoscopically.

It is questionable how pneumoperitoneum in laparoscopic approach affect on the survival of women with persistent metastatic ovarian cancer. Abu-Rustum NR et al. (18) described the survival of women with stage III-IV ovarian cancer as documented by positive second-look laparoscopy or laparotomy. They concluded that laparoscopy with CO₂ pneumoperitoneum does not appear to reduce the overall survival in women with intraabdominal metastases.

ROBOTICS IN OVARIAN CANCER SURGERY

Some clinical centers are using the da Vinci robotic surgical system. Brown JV 3rd et al. (19) founded a low incidence of lymph node metastases and suitable readmission rate by using robotic-assisted surgical staging. They retrospectively reviewed the charts of presumed early-stage ovarian cancer patients who underwent robotic-assisted surgery which included a pelvic and para-aortic lymphadenectomy. There was no intraoperative and postoperative complications. However, they suggested that surgeons should consider a systematic lymph node resection to advise a best clinical evaluation, because the prevalence of affected lymph node can approach 20% in select patients. Nezhat FR et al. (20) founded that perioperative outcomes are comparable between conventional laparoscopy and robotic-assisted laparoscopy in both early and advanced disease. These approaches are not inferior to laparotomy and they are acceptable access in selected patients.

CONCLUSION

Laparoscopic surgery is acceptable access in selected patients. It is associated with a faster recovery and decreased perioperative morbidity compared with laparotomy. Further studies are needed to confirmed equivalence between laparoscopic surgery and laparotomy in women with ovarian cancer.

REFERENCES

1. Kinkel K, Lu Y, Mehdizade A, et al. Indeterminate ovarian mass at US: incremental value of second imaging test for characterization-meta-analysis and Bayesian analysis. *Radiology* 2005; 236(1):85-94.
2. Levine D, Brown DL, Andreotti RF, et al. Management of asymptomatic ovarian and other adnexal cysts imaged at US: Society of Radiologists in Ultrasound Consensus Conference Statement. *Radiology*. 2010;256(3): 943-54.
3. Myers ER, Bastian LA, Havrilesky LJ, et al. Management of Adnexal Mass. Evidence Report/Technology Assessment No.130 (Prepared by the Duke Evidence-based Practice Center under Contract No.290-02-0025). AHRQ Publication No. 06-E004, Agency for Healthcare Research and Quality, Rockville, 2006.
4. Buys SS, Partridge E, Greene MH et al. Ovarian cancer screening in the Prostate, Lung, Colorectal and Ovarian (PLCO) cancer screening trial: findings from the initial screen of randomized trial. *Am J Obstet Gynecol*. 2005;193(5):1630-9.
5. Park HJ, Kim DW, Yim GW, et al. Staging laparoscopy for the management of early-stage ovarian cancer: a metaanalysis. *Am J Obstet Gynecol*. 2013;209(1): 58.e1-8.
6. Fagotti A, Ferrandina G, Fanfani F, et al. Prospective validation of a laparoscopic predictive model for optimal cytoreduction in advanced ovarian carcinoma. *Am J Obstet Gynecol*. 2008;199(6):642.e1-6.
7. Fagotti A, Fanfani F, Ludovisi M, et al. Role of laparoscopy to assess the chance of optimal cytoreductive surgery in advanced ovarian cancer: a pilot study. *Gynecol Oncol*. 2005;96(3):729-35.
8. Ghezzi F, Cromi A, Uccella S, et al. Laparoscopy versus laparotomy for the surgical management of apparent early stage ovarian cancer. *Gynecol Oncol*. 2007; 105(2):409-13.
9. Park JY, Kim DY, Suh DS, et al. Comparison of laparoscopy and laparotomy in surgical staging of early-stage ovarian and fallopian tubal cancer. *Ann Surg Oncol*. 2008;15(7):2012-9.
10. Köchli OR, Schnegg MP, Müller DJ, Surbek DV. Endobag extractor to remove masses during laparoscopy. *Obstet Gynecol*. 2000 Feb;95(2):304-5.

11. Sainz de la Cuesta R, Goff BA, Fuller AF Jr, Nikrui N, Eichhorn JH, Rice LW . Prognostic importance of intraoperative rupture of malignant ovarian epithelial neoplasms. *Obstet Gynecol.* 1994;84(1):1-7.
12. Goudge CS, Li Z, Downs LS Jr. The influence of intraoperative tumor rupture on recurrence risk in Stage Ic epithelial ovarian cancer. *Eur J Gynaecol Oncol.* 2009; 30(1):25-8.
13. Canis M, Rabischong B, Botchorishvili R, et al. Risk of spread of ovarian cancer after laparoscopic surgery. *Curr Opin Obstet Gynecol.* 2001;13(1):9-14.
14. Kim HS, Ahn JH, Chung HH, Kim JW, Park NH, Song YS, Lee HP, Kim YB. Impact of intraoperative rupture of the ovarian capsule on prognosis in patients with early-stage epithelial ovarian cancer: a meta-analysis. *Eur J Surg Oncol.* 2013 Mar;39(3):279-89.
15. Bakkum-Gamez JN, Richardson DL, Seamon LG, Aletti GD, Powless CA, Keeney GL, O'Malley DM, Cliby WA. Influence of intraoperative capsule rupture on outcomes in stage I epithelial ovarian cancer. *Obstet Gynecol.* 2009 Jan;113(1):11-7.
16. Zivanovic O, Sonoda Y, Diaz JP, Levine DA, Brown CL, Chi DS, Barakat RR, Abu-Rustum NR. The rate of port-site metastases after 2251 laparoscopic procedures in women with underlying malignant disease. *Gynecol Oncol.* 2008 Dec;111(3):431-7.
17. Morice P, Viala J, Pautier P, Lhomme C, Duvillard P, Castaigne D. Port-site metastasis after laparoscopic surgery for gynecologic cancer. A report of six cases. *J Reprod Med.* 2000 Oct;45(10):837-40.
18. Abu-Rustum NR, Sonoda Y, Chi DS, Teoman H, Dizon DS, Venkatraman E, Barakat RR. The effects of CO2 pneumoperitoneum on the survival of women with persistent metastatic ovarian cancer. *Gynecol Oncol.* 2003 Aug;90(2):431-4.
19. Brown JV 3rd, Mendivil AA, Abaid LN, Rettenmaier MA, Micha JP, Wabe MA, Goldstein BH. The safety and feasibility of robotic-assisted lymph node staging in early-stage ovarian cancer. *Int J Gynecol Cancer.* 2014 Oct;24(8):1493-8.
20. Nezhat FR, Finger TN, Vetere P, Radjabi AR, Vega M, Averbuch L, Khalil S, Altinbas SK, Lax D. Comparison of perioperative outcomes and complication rates between conventional versus robotic-assisted laparoscopy in the evaluation and management of early, advanced, and recurrent stage ovarian, fallopian tube, and primary peritoneal cancer. *Int J Gynecol Cancer.* 2014 Mar;24(3):600-7.

Author's address: Lucija Kostić, Department of Gynecologic Oncology, University Hospital for Tumors, University Hospital Center Sestre milosrdnice, Ilica 197, 10000 Zagreb, Croatia. e-mail: lucija105@gmail.com