



# Peritoneal carcinomatosis: minimally invasive surgery is primarily to blame

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The Laparoscopic Approach to Cervical Cancer (LACC) trial was a prospective randomized trial comparing open versus minimally invasive radical hysterectomy in patients with early stage cervical cancer (International Federation of Gynecology and Obstetrics (FIGO) 2009 stage IA1 with lymphovascular invasion-IB1).<sup>1</sup> This study demonstrated that minimally invasive radical hysterectomy was associated with lower rates of disease free survival and overall survival than open radical hysterectomy. When these findings were published, there was an immediate effort to try to identify the reasons as to why these findings were shown, as many surgeons explored potential strategies to address these with the hope that targeting these issues would provide a solution and perhaps continue to offer women with cervical cancer minimally invasive surgery.

Among the most plausible reasons for the findings of the LACC trial was the issue of tumor contamination, as suggested by the fact that with the minimally invasive surgery approach the uterine manipulator was used in the majority of patients, thus leading to potential tumor spillage and exposure to the abdominal and pelvic cavity. The Surgery in Cervical Cancer, Observational, Retrospective (SUCCOR) study was a European, multicenter, retrospective, observational cohort study that evaluated disease free survival in patients with FIGO 2009 stage IB1 cervical cancer who underwent either open or minimally invasive radical hysterectomy.<sup>2</sup> The study showed that minimally invasive radical hysterectomy increased the risk of relapse and death compared with open surgery. The investigators also evaluated a number of factors that might impact oncologic outcomes. Of these, avoiding the use of the uterine manipulator and using a vaginal protective maneuver to minimize the risk of tumor exposure was associated with similar outcomes to open surgery. In fact, patients who had use of a uterine manipulator had a 2.76 times higher chance of a relapse compared with those in the open surgery group (95% confidence interval 1.75 to 4.33,  $p < 0.001$ ). In a study by Kong et al,<sup>3</sup> the authors evaluated 128 patients who underwent radical hysterectomy by minimally invasive surgery and compared recurrence between patients who underwent vaginal colpotomy and those who had intracorporeal colpotomy. The recurrence rate in the vaginal colpotomy group was 16% and in the latter group, 5%. Among those

with recurrence in the intracorporeal group, 62% had carcinomatosis.

Hoegl and colleagues<sup>4</sup> performed a systematic review and meta-analysis to assess the incidence of peritoneal carcinomatosis in patients undergoing minimally invasive versus open radical hysterectomy. A total of 7626 patients were included in the analysis. The authors found that peritoneal carcinomatosis represented 22.2% of recurrences in minimally invasive surgery compared with 8.8% in open surgery, accounting for 15% of all recurrences. Given these findings, what can be done to prevent this ominous pattern of recurrence from taking place as it is often associated with a very poor prognosis. Many might argue that our practice should reflect the guideline recommendations for open surgery.<sup>5</sup> However, there are a number of trials that are currently ongoing.<sup>6,7</sup> In these trials, patients might be potentially exposed to the risk of recurrence as carcinomatosis. A vaginal protective maneuver has been implemented in these trials as an attempt to circumvent tumor spillage and, as an added measure of caution, no uterine manipulator is used.

As we explore this pattern of recurrence, we must consider that there will be no prospective randomized trial evaluating this question. Similarly, data derived from animal studies may not be feasible as it is difficult to replicate the scenario seen in humans. Why does it happen? No one truly knows, but for now, we must learn from this experience and once again reaffirm that carcinomatosis is a legitimate pattern of recurrence with an associated poor outcome and thus we must strive to not expose our patients to such risk by performing minimally invasive surgery outside of clinical trials.

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## REFERENCES

- 1 Ramirez PT, Frumovitz M, Pareja R, *et al.* Minimally invasive versus abdominal radical hysterectomy for cervical cancer. *N Engl J Med* 2018;379:1895–904.
- 2 Chiva L, Zanagnolo V, Querleu D, *et al.* SUCCOR study: an international European cohort observational study comparing minimally invasive surgery versus open abdominal radical hysterectomy in patients with stage IB1 cervical cancer. *Int J Gynecol Cancer* 2020;30:1269–77.
- 3 Kong T-W, Chang S-J, Piao X, *et al.* Patterns of recurrence and survival after abdominal versus laparoscopic/robotic radical hysterectomy in patients with early cervical cancer. *J Obstet Gynaecol Res* 2016;42:77–86.
- 4 Hoegl J, Viveros-Carreno D, Palacios AT. Peritoneal carcinomatosis after minimally invasive vs open radical hysterectomy: systematic review and meta-analysis. *Int J Gynecol Cancer* 2022;32:1497–504.
- 5 National Comprehensive Cancer Network. Cervical cancer. NCCN clinical 311 practice guidelines in oncology. Available: <http://www.nccn.org> [Accessed 23 May 2022].
- 6 Falconer H, Palsdottir K, Stalberg K, *et al.* Robot-Assisted Approach to Cervical Cancer (RACC): an international multi-center, open-label randomized controlled trial. *Int J Gynecol Cancer* 2019;29:1072–6.
- 7 A trial of robotic versus open hysterectomy surgery in cervix cancer 458 (ROCC). Available: <https://clinicaltrials.gov/ct2/show/NCT04831580> [Accessed 5 Mar 2022].