



Educational video

Technique of ICG-guided Targeted Compartmental Pelvic Lymphadenectomy (TCL) combined with Pelvic Peritoneal Mesometrial Resection (PMMR) for locoregional control of endometrial cancer – A proposal



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ARTICLE INFO

Keywords:

Endometrial cancer
Surgery
Targeted Compartmental Lymphadenectomy
PMMR
ICG

Lymphatic network of the uterus can be visualized by intracorporal injection of indocyanine green (ICG) as guide in compartmental surgery (Kimmig et al., 2016a; Kimmig et al., 2016b). Compartmental surgery may be able to effectively control for locoregional tumour recurrence and reducing perioperative complications at the same time by resecting the tumour within the borders of the corresponding morphogenetic fields (Höckel, 2015; Höckel et al., 2009; Santiago et al., 2016). There is first evidence, that this may hold true also for endometrial cancer in intermediate/high risk endometrial cancer (Kimmig et al., 2015). However, the systematic lymphadenectomy increases morbidity; as a consequence diagnostic sentinel node biopsy was investigated; there is evidence that the accuracy of detection of positive nodes is excellent with a very low false negative rate also with respect to paraaortic disease (Zahl Eriksson et al., 2016; Darin et al., 2016; Sinno et al., 2016; Tschernichovsky et al., 2016; Ruscito et al., 2016). Thus, performing a resection of the tumour bearing compartment “*en bloc*” together with the lymphatic network including the sentinel nodes, it may be suggested that this surgery may be able to control for locoregional recurrence in the pelvis up to the pelvic nodes resected (therapeutically) comparable to (Kimmig et al., 2015) and indicates further need of treatment downstream to these nodes in node positive disease (diagnostically).

The video defines the technique of “*en bloc*” resection of the uterus together with its corresponding embryonal compartment (pelvic PMMR) and part for the first draining lymph compartments containing the sentinel nodes (TCL). This will be basis for an international

multicenter study under consideration to evaluate the locoregional control of this procedure without additional adjuvant irradiation; systematic pelvic and paraaortic lymphadenectomy will be added in case of node positive disease.

Supplementary data to this article can be found online at <http://dx.doi.org/10.1016/j.gore.2017.04.002>.

References

- Kimmig, R., Aktas, B., Buderath, P., Rusch, P., Heubner, M., 2016 Apra. Intraoperative navigation in robotically assisted compartmental surgery of uterine cancer by visualisation of embryologically derived lymphatic networks with Indocyanine-green (ICG). *J. Surg. Oncol.* 113 (5), 554–559. <http://dx.doi.org/10.1002/jso.24174>.
- Kimmig, R., Aktas, B., Buderath, P., Heubner, M., 2016 Mar 19b. Robotically assisted peritoneal mesometrial resection (PMMR) in endometrial cancer supported by ICG labeling of the compartmental lymphatic system. *Gynecol Oncol Rep.* 16, 24. <http://dx.doi.org/10.1016/j.gore.2016.03.004>.
- Höckel, M., 2015 Mar. Morphogenetic fields of embryonic development in locoregional cancer spread. *Lancet Oncol.* 16 (3), e148–e151. [http://dx.doi.org/10.1016/S1470-2045\(14\)71028-9](http://dx.doi.org/10.1016/S1470-2045(14)71028-9).
- Höckel, M., Horn, L.-C., Manthey, N., et al., 2009. Resection of the embryologically defined uterovaginal (Müllerian) compartment and pelvic control in patients with cervical cancer: a prospective analysis. *Lancet Oncol.* 10, 683–692.
- Santiago, I.A., Gomes, A.P., Heald, R.J., 2016 Jun. An ontogenetic approach to gynecologic malignancies. *Insights Imaging.* 7 (3), 329–339. <http://dx.doi.org/10.1007/s13244-016-0480-y>. (Review).
- Kimmig, R., Iannaccone, A., Aktas, B., Buderath, P., Heubner, M., 2015. Embryologically based radical hysterectomy as peritoneal mesometrial resection (PMMR) with pelvic/paraaortic lymphadenectomy for loco-regional tumour control in endometrial cancer – first evidence for efficacy. *Arch. Gynecol. Obstet.* <http://dx.doi.org/10.1007/s00404-015-3956-y>.

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<http://dx.doi.org/10.1016/j.gore.2017.04.002>

Received 2 December 2016; Received in revised form 21 March 2017; Accepted 4 April 2017

Available online 06 April 2017

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- Zahl Eriksson, A.G., Ducie, J., Ali, N., McGree, M.E., Weaver, A.L., Bogani, G., Cliby, W.A., Dowdy, S.C., Bakkum-Gamez, J.N., Abu-Rustum, N.R., Mariani, A., Leitao Jr., M.M., 2016 Mar. Comparison of a sentinel lymph node and a selective lymphadenectomy algorithm in patients with endometrioid endometrial carcinoma and limited myometrial invasion. *Gynecol. Oncol.* 140 (3), 394–399. <http://dx.doi.org/10.1016/j.ygyno.2015.12.028>.
- Darin, M.C., Gómez-Hidalgo, N.R., Westin, S.N., Soliman, P.T., Escobar, P.F., Frumovitz, M., Ramirez, P.T., 2016 Feb 1. Role of indocyanine green in sentinel node mapping in gynecologic cancer: is fluorescence imaging the new standard? *J. Minim. Invasive Gynecol.* 23 (2), 186–193. <http://dx.doi.org/10.1016/j.jmig.2015.10.011>. (Review).
- Sinno, A.K., Peijnenburg, E., Fader, A.N., Temkin, S.M., Stone, R., Levinson, K., Murdock, T., Tanner, E.J., 2016 Nov. Reducing overtreatment: a comparison of lymph node assessment strategies for endometrial cancer. *Gynecol. Oncol.* 143 (2), 281–286. <http://dx.doi.org/10.1016/j.ygyno.2016.08.323>.
- Tschernichovsky, R., Diver, E.J., Schorge, J.O., Goodman, A., 2016 Oct. The role of lymphadenectomy versus sentinel lymph node biopsy in early-stage endometrial cancer: a review of the literature. *Am. J. Clin. Oncol.* 39 (5), 516–521. <http://dx.doi.org/10.1097/COC.0000000000000302>.
- Ruscito, I., Gasparri, M.L., Braicu, E.I., Bellati, F., Raio, L., Sehouli, J., Mueller, M.D., Panici, P.B., Papadia, A., 2016 Oct. Sentinel node mapping in cervical and endometrial cancer: indocyanine green versus other conventional dyes—a meta-analysis. *Ann. Surg. Oncol.* 23 (11), 3749–3756. <http://dx.doi.org/10.1245/s10434-016-5236-x>. (Review).