

LÁSZLÓ TARNAI , LÁSZLÓ UNGÁR

Complication of the laterally extended parametrectomy (LEP) procedure.

Abstract:

Introduction: Since 1993 an operative technique without adjuvant therapy (laterally extended parametrectomy, the LEP procedure) has been in use at our institution for the treatment of stage IIB cervical cancer and patients with pelvic lymph node metastases in stages IA-IIA. Iliac/femoral artery embolic occlusion in the cohort of LEP operated patients was studied in an 11 years long period.

Methods: LEP-Wertheim procedure was used in 320 patients between 1994 and 2005. Embolic occlusion of the iliac and/or femoral arteries was detected in 4 out of 255 (1.6%) cases.

Thrombectomy on one blood vessel in 3 cases, on both deep and superficial femoral arteries in 1 case were executed to restore the vessel patency.

Results: 3 out of 4 patients following external iliac/femoral artery emboli removal healed up without any arterial occlusion related symptoms. In one case preventive fasciotomy was needed to treat tumescence of the legs. This patient developed transient peroneus palsy, which necessitated the use of a plantar support for one month and physiotherapy for one year for gait rehabilitation.

Conclusions: Embolus occlusion of the iliac/femoral artery during LEP/Wertheim procedure was observed in 1.6% of cases. This complication was not reported in the literature before in relation to radical surgery in cervical cancer. Operating teams using LEP operations, should be aware of that risk, and should be prepared for treatment.

Keywords: Femoral artery embolus, cervical cancer, LEP operation,

Introduction:

In 1993, an extensive surgical technique (laterally extended parametrectomy, the LEP procedure) was introduced in St. Stephen Hospital for the treatment of cervical cancer patients with histology proven pelvic lymph node metastases (1,2) and stage II/B disease. Traditional Wertheim procedure - with or without adjuvant radiotherapy - failed to cure 40-45% of patients with lymph node positive stage IB cervical cancer (3). Since 1999, clinical trials have reported a decreased risk for recurrence with the concomitant use of chemo- and radiotherapy in the adjuvant treatment of patients with high-risk early stage cervical cancer following radical surgery (4,5). Results of the LEP Wertheim procedure (1,2) suggested however a better chance for survival and a smaller risk for severe side effects than that of reported with the use of concomitant radical surgery and chemo- irradiation. LEP Wertheim procedure has been a standard treatment of certain conditions for the last 17 years in our institution. The growing experience enabled us to report about femoral artery embolism - a relative uncommon complication - of the procedure.

Patients and methods

Between 1994 and 2005, 255 cases of stage IIB and intra-operative histology proven pelvic lymph node metastases stage IA-IIA cervical cancer patients were treated by the "LEP Wertheim" procedure (1,2). 4 out of 255 patients (1.6%) developed an iliac/femoral artery occlusion.

Age of the four patients discussed in this paper ranged between 32-52 years. General condition was acceptable for an extensive surgical procedure (ASA 1-2) in all cases. No thrombosis or any other vascular disease was mentioned in the medical history of our 4 cases. No signs of extensive atherosclerosis were seen in these patients during their operation. No further vascular disease of our 4 cases occurred in the 5 years long follow-up period.

In 3 cases the complication was detected during the operation, in one case in the early post-operative period (within 3 hours after completion of the operation).

Procedures on the iliac arteries during the LEP operation: the main branches of the hypogastric artery and vein are clamped and

dissected. Common iliac artery and vein are elevated from the pelvic sidewall. At the pelvic edge of the clean surface of the psoas muscle, the pelvic sequence of the lumbo-sacral nerve is exposed. The parietal branches of the hypogastric artery and vein, situated above the lumbar branch of the lumbosacral nerve, are dissected at the site where they enter the pelvic sidewall structures (psoas muscle). The distal extension of the dissection of the lumbo-sacral plexus reveals the suprapiriformis foramen. The pelvic sidewall behind the external iliac blood vessels, the obturator nerve and the ureter is cleared of the lymph-node and lymph-vessel containing fibro-fatty tissue. The lumbo-sacral nerve dissection needs special attention, since physical or heat injury of the lumbar nerve branch might result loss of peroneus nerve function, and as a consequence, induce peroneus paresis. During that sequence of the operation, thorough retraction of the iliac vessels - with the stump of a resected hypogastric artery - facilitates the surgery. Retraction results traction and compression of the previously operated iliac artery, that might influence/enhance thrombosis.

Symptoms of arterial occlusion: In three of our four cases occlusion occurred on the intra-pelvic sequence of the external iliac artery. Lack of pulsating draw our attention to the complication. In the remaining case, lower sequences of the deep and superficial femoral artery were affected, and the complication was not detected during surgery. The patient woke up with an unbearable pain in the affected leg. The white color, cool temperature, poor microcirculation and lack of detectable arterial pulse on physical and ultrasound-doppler examination indicated an arterial embolus occlusion.

Treatment of artery occlusion: In the three patients, where the embolus occlusion was detected inside the pelvis on the iliac arteries, Fogarty-catheter embolus removal was used through the incision of the common iliac artery, following full heparin suspension of coagulation. In the case, where the complication was detected in the post operative period, the femoral artery at and above the branching of the deep femoral artery was exposed through an inguinal incision. Under full heparin coagulation-suspension, embolus removal was successfully executed by the use of a series of Fogarty-catheters from the superficial and the deep femoral arteries. Operating time of the embolectomy ranged from 30 min to 2h. Blood transfusion was necessary in all of our 4 cases (mean 3.3 units).

In the post operative period in this latter patient post hypoxia tumescence of the legs were noted. Preventive fasciotomy was executed.

Results:

All four patients were seen at our outpatient clinic at one year follow up. 3 patients - where iliac artery occlusion were discovered during the LEP operation, and embolectomy was executed during the primary laparotomy - healed up without any symptoms that might be in connection with blood supply of the legs.

At the remaining patient -where artery occlusion was detected in the post-operative period, and patency of the arterial blood supply was reconstructed at a second operation-, the following symptoms were observed: growing pain on the 2nd post operative day, tumescence and loss of peroneus muscle function. Following preventive fasciotomy, a slow decrease of pain and tumescence was seen. Recovery of the peroneus muscle function was detectable from the fourth post operative week. During the treatment with open wound care, physiotherapy and pain control slow improvement of the general condition and gait function (with plantar support) was detected in the first 60 post operative days. After the healing of the fasciotomy wounds, physiotherapy was necessary to rehabilitate peroneus and gait function for 12 months. At the one year follow up -apart from cosmetic problems of the fasciotomy scars- the patient had a fully recovered gait function. The patient was emitted from the hospital on the 32nd post operative day. Cosmetic (plastic surgery) repair of the fasciotomy scars were completed in the 2nd post treatment year.

Discussion:

In the present study, we report our experience with iliac/femoral arterial embolism, detected as a complication of the laterally extended parametrectomy (LEP) procedure.

There is a foreseeable risk of morbidity associated with radical hysterectomy including bladder dysfunction, urinary tract fistulae and large volume blood loss (6,7,8).

Femoral artery embolus has not been listed before as a radical hysterectomy complication in the related literature (6). Iatrogenic

(surgical intervention related) arterial emboli has been reported (9,10,11,12) by urologic, head and neck and vascular surgeons. The experience with our four patients (although 1.6% of the LEP operated patients only) suggest, that iliac/femoral artery embolic occlusion risk of the LEP procedure is significant.

Early detection and emergency intervention seems to be paramount importance in preventing severe consequences of this complication. We suggest a vigilance during and at the end of the LEP Wertheim procedure in view of this complication. Our experience prompted us to get prepared for an embolectomy before starting a LEP procedure.

References:

1. Ungar L, Palfalvi L. Surgical treatment of lymph node metastases in stage IB cervical cancer: the laterally extended parametrectomy (LEP) procedure. *Int J Gynecol Cancer*. 2003 Sep-Oct;13(5):647-5
2. Palfalvi L, Ungar L. Laterally extended parametrectomy (LEP), the technique for radical pelvic side wall dissection: Feasibility, technique and results. *Int J Gynecol Cancer*. 2003 Nov-Dec;13(6):914-7.
3. Koh WJ, Panwala K, Greer B. Adjuvant therapy for high-risk, early stage cervical cancer. *Semin Radiat Oncol* 2000;10(1):51-60. Review.
4. Uno T, Ito H, Itami J, Sato T, Minoura S, Yasuda S, Aruga T, Isobe K, Shigematsu N, Kubo A. Adjuvant pelvic irradiation in patients with pathologic T2b carcinoma of the uterine cervix. *Int J Gynecol Cancer* 2002;12(2):187-91
5. Peters WA, Liu PY, Barrett RJ, Stock RJ, Monk BJ, Berek JS, Souhami L, Grigsby P, Gordon W, Alberts DS. Concurrent chemotherapy and pelvic radiation therapy compared with pelvic radiation therapy alone as adjuvant therapy after radical surgery in high-risk early-stage cancer of the cervix. *J Clin Oncol* 2000;18(8):1606-13
6. Covens A, Rosen B, Murphy J, Laframboise S, DePetrillo AD, Lickrish G, Colgan T, Chapman W, Shaw P. How important is removal of the parametrium at surgery for carcinoma of the cervix? *Gynecol Oncol* 2002;84(1):145-9.
7. Averette HE, Method MW, Sevin B-U, Penalver MA. Radical abdominal hysterectomy in the primary management of invasive cervical cancer. In: Rubin SC, Hoskins WJ, eds. *Cervical cancer and preinvasive neoplasia*. Philadelphia: Lippincott-Raven Publishers 1996:189-206
8. Ralph G, Winter R, Michelitsch L, Tamussino K. Radicality of parametrial resection and dysfunction of the lower urinary tract after radical hysterectomy. *Eur J Gynaecol Oncol* 1991;12(1):27-30
9. Nevoux P, Zini L, Villers A, Boleslawski E, Nunes B, Zerbib P. Celiac axis and superior mesenteric artery: danger zone for left nephrectomy. *J Endourol*. 2008 Nov;22(11):2571-4.

- 10.** Lin MS, Chen YH, Chao CC, Lin CH, Li HY, Chao CL, Chen MF, Kao HL. Catheter-based neurosalvage for acute embolic complication during carotid intervention. *J Vasc Surg.* 2010 Aug;52(2):308-313
- 11.** Caceres A., Mourton S.M, Bochner B.H., Gerst S.R, Liu L., Alektiar K.M. Kardos S.V, Barakat R.R., Boland P.J., Chi D.S. Extended pelvic resections for recurrent uterine and cervical cancer: out-of-the-box surgery *International Journal of Gynecological Cancer* Volume 18, Issue 5, pages 1139–1144, September/October 2008
- 12.** Takashi N, Kiyonori H, Hirotaka A, Akihiko T, Satoshi E, Yoshihiro K, Atsushi Y, Kazuki U, Shigeru I, Analytic Review of 2372 Free Flap Transfers for Head and Neck Reconstruction Following Cancer Resection *J reconstr Microsurg* 2003; 19(6): 363-368