

# Laparoscopy in elderly women

## *Laparoskopia u starszych kobiet*

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### Summary

The elderly population has become an increasingly large part of the total population, and this group has shown higher rates of comorbid diseases. A review of the literature supports the belief that advanced age does not seem to be a contraindication for conventional or laparoscopic surgery. However, considering the high comorbidity of elderly patients, conducting an overall risk assessment and an adequate hemodynamic monitoring is highly recommended.

**Key words:** laparoscopy, elderly women, postmenopausal women.

### Streszczenie

Populacja kobiet starszych wciąż wzrasta, obserwuje się w niej więcej chorób współistniejących. Przegląd piśmiennictwa z ostatnich lat wskazuje, że wiek nie powinien być czynnikiem kwalifikującym do operacji laparoskopowej lub laparotomii, jednakże częste występowanie chorób współistniejących wymaga bezwzględnej dokładnej oceny całkowitego ryzyka operacji oraz monitorowania stanu hemodynamicznego pacjentki podczas całego zabiegu.

**Słowa kluczowe:** laparoscopia, starsze kobiety, kobiety po menopauzie.

### Changes subject to the human age

Traditionally, people over 65 years of age are ranked as an elderly population, but it is commonly considered that the calendar age and the biological age are not identical and various human organs age in a different way.

### Circulatory system

Tendency to orthostatic hypotension and a huge liability of mechanisms responsible for regulating pressure is typical of elderly patients. It is important to take notice of it during anaesthesia. Bradycardia occurs more often during operations. Cardiac output in elderly patients is held because of appropriate heart filling during diastole of the heart (Frank-Starling mechanism). It shows the importance of regulation of liquid administration during operations [1, 2].

### Respiratory system

Thorax becomes more rigid, lungs lose elasticity and a surface of alveoli diminishes. Reduced respiratory drive under the influence of hypercapnia or hypoxia in elderly patients (over 80 years of age it is a half of the proper value) is more decreased under the influence of anaesthesia and sedating drugs. The risk of respiratory failure is increased especially in an early postoperative period [2].

### Kidneys' function

Renal blood flow, glomerular filtration, secretion in renal tubules and tubular re-absorption diminish. Elderly women are at risk from perioperative renal insufficiency. Creatinine clearance declines with age. However creatinine concentration in serum is normal because of reduced muscles mass. Accordingly, even a small increase in the creatinine level could be a symptom of

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renal disease. Water and electrolyte balance disorder, like hyponatraemia (reduced capability to urine concentration) and hyperkalaemia (reduced activity of renin-angiotensin-aldosterone system) appears easier than in a younger population. [2].

### Advantages

Operative laparoscopy is acknowledged as a “gold standard” in many benign diseases of female reproductive organs. Laparoscopic operations in elderly women are performed with an attitude to pathological tissue or organ. The rule is to avoid widening procedures` range if there is no malignant leisure.

Patients' earlier mobilization is possible because of minor incision of abdominal wall, faster wound healing and reduced postoperative pain. That fact is important in elderly women because of high risk of thrombo-embolic complications. Faster convalescence is possible owing to the lower risk of adhesions and intestinal obstruction. The risk of infection is much lower in laparoscopy than laparotomy and transvaginal surgery. In some cases (for example patients with high risk of bacterial endocarditis or predisposed to hysterectomy) it is indicated to apply preventive antibiotic therapy. Patients, who are discharged from hospital should be informed about the necessity of monitoring the body temperature and should report to the hospital when it exceeds 38°C.

Postoperative complications, subjective postoperative complaints, intraoperative blood loss, markers of inflammation and quantity of analgesics used in the postoperative period were estimated and compared in the research undertaken by Bushweitz among 23 patients over 60 years old, operated because of ovarian tumour. Significantly higher and longer-lasting values of inflammatory markers like interleukin 6 (Il-6) and C-reactive protein (CRP) were found in a group of patients after laparotomy. Higher levels of CRP were also proportional to the operation time. Higher blood loss was observed during laparotomy (decreasing haemoglobin concentration by 1.7 mg/dl vs. 1.4 mg/dl during laparoscopy). Percentage quantity of analgesics used after laparotomy was higher by 30% [3].

Authors of the same research confirm the thesis of 10 minutes shorter laparoscopic operation time comparing to laparotomy. In a prospective study postoperative complications were evaluated. In the “laparotomy” group there were 3 huge complications in 30 days after the operation day (1 case of thrombosis, 1 case of pulmonary embolism and 1 postoperative hernia), in the “laparoscopy” group no significant postoperative complications were found [3].

Cemil Yaman et al. underline that in elderly women's cases there is a correlation between laparoscopic operation success and operator's experience [1].

### Complications

However, use of laparoscopy increases the risk of cardiovascular complications. Higher intraabdominal pressure can cause asystolia, myocardial infarction, arrhythmia. Gas insufflation can complicate into pneumothorax, pneumopericardium, mediastinal emphysema. Intraoperative heart arrhythmia occurs significantly often. This is because of many factors, the main two are: hypercapnia and acidosis. The hypercapnia rate is reduced with intra-abdominal pressure not higher than 12 mm Hg. In elderly patients most often less than 10 mm Hg [4].

Pneumoperitoneum and operation's body position have a potential bad influence on the operation course. Because of this special preoperative estimation should be done for patients with pulmonary and cardiac diseases. There is a higher risk of complications for patients with congestive heart failure and valvular incompetence than patients with ischemic coronary heart disease. Trendelenburg's position and diaphragm elevation can raise peak expiratory pressure, systemic pressure and lower stroke volume. Only small tilts are used in Trendelenburg's position [5].

Changes in pulmonary caused by ageing – lower alveoli elasticity and thorax compliance, higher residual capacity – reduce total lung compliance and induce necessity for using lower level of CO<sub>2</sub> pressure. Whilst in regular cases a 12-16 mm Hg pneumoperitoneum is used, in elderly cases the maximum value is 12-13 mm Hg or gasless laparoscopy can be used. In gasless laparoscopy, intraabdominal retractors connected to pneumatic or mechanical elevating system are used to produce intraabdominal tent-like space. This gasless technique (also called “apneumatical”) has some advantages coming from producing pneumoperitoneum, especially in patients with cardiovascular diseases. No cannulas with sealing are demanded in this procedure and surgical instruments do not have to be the same shape (narrow and cylindrical). Because of that it is possible to use some of conventional instruments directly by integument incisions [4].

Decrease of physiological glomerular filtration and renal flow can predispose elderly patients to postoperative renal insufficiency and higher sensitivity to toxic drug action. Beneficial solution is gradual insufflation of CO<sub>2</sub> to the maximum 12 mm Hg and avoiding hypovolemia during operation.

Wound infection after the laparoscopic procedure is not an often complication. Most of cases are small skin infections. Severe necrotic fasciitis occurs sporadically. Cystitis, parametritis and pelvic abscess were also observed.

Contraindications to laparoscopic procedure in elderly women are the same as for the whole population.

Absolute contraindications are intestinal obstruction, huge tumour changes in abdominal cavity, generalised peritonitis, irreducible hernia, heart insufficien-

cy, recent myocardial infarction, respiratory failure and severe obstructive lung disease.

Relative contraindications are: many abdominal operations in patient's medical history, purulent lesions on abdominal wall, significant obesity, oesophageal hiatus hernia, ischemic coronary heart disease and coagulation system disorders.

### Ovarian tumours

Incidence of ovarian carcinoma increases with human age. Most of cases are found in women after menopause [6, 7].

Non-suspicious ovarian tumours in elderly patients can be operated in laparoscopic way. Every ovarian tumour diagnosed in an elderly patient is an indication to operation. Laparoscopy is permitted if there are no ultrasound markers of malignancy (no endo- and egzophytic excrescences within the tumour) confirmed by Doppler-USG (high resistance flow is correct), value to 10 cm and proper concentration of Ca-125 [6-9].

In the research undertaken by Buschweitz et al. comparing laparoscopic operations and laparotomy in non-malignant ovarian tumours there were histopathologically confirmed 11 adenofibromas, 4 serous cystadenomas, 1 mucous cystadenoma and 4 functional cysts [3, 6, 9].

Buschwitz and Matthias underline an increased risk of ovarian carcinoma in women after menopause even in spite of no earlier symptoms of tumour's malignancy. Among 23 patients over 60 years old subjected to adnexectomy 2 were excluded from research because of malignant ovarian carcinoma found intraoperatively, with a concentration of Ca 125 lower than 35 IU/ml and no ultrasound markers of malignancy [3]. It is necessary to examine the tumour intraoperatively and avoid damaging of the tumour during its excision [3, 6].

During laparoscopy in postmenopausal women considering higher risk of malignant change it should be decided to undertake adnexectomy, unilateral or bilateral, with obligatory intraoperative examination, without impairing a tumour (remove it completely using endobag). Enucleations of cysts are not executed in postmenopausal women. However Tinelli et al. (2009) compared two techniques of laparoscopic access in postmenopausal women underwent laparoscopic surgery for simple ovarian cysts and observed that direct optical access is connected with significantly reduced time for abdominal entry as well as the occurrence of minor vascular injuries [10-12].

The research by Sturlese et al. (2008) in a group of 64 postmenopausal women with adnexal masses with no ultrasound scan indications malignant lesions confirm that the removal of a cystic mass in postmenopausal patients with laparoscopic surgery is a more valid and acceptable alternative to traditional surgery [9, 10, 12]. It was also confirmed by Attia et al. (2007)

on a group of 18 postmenopausal women with ovarian cysts admitted to the hospital for laparoscopy [10, 13].

Whereas there is no necessity to widen the range of operation without other pathological changes in female reproductive organs. In this case operation is constricted to ovary. Conversion to laparotomy and complete oncological protocol is necessary when malignant or borderline changes are found during laparoscopy.

Similarly finding tissue outgrowths in peritoneal cavity, massive and fragile adhesions and/or ascites during putting optical trocars into an abdominal cavity means it is necessary to give laparoscopic procedure up and converse it to laparotomy from longitudinal incision to undertake a systemic surgical and pathologic procedure [14]. During laparoscopic adnexectomy because of potential non-malignant ovarian tumours, malignant change is found in 0.4% of cases and borderline tumours are found in 2.5 % of cases [7]. Disruption of the tumour's capsule (spontaneous or intentional) is important in the case of malignant nature of the change, because it changes the degree of clinical advancement from IA to IC. Multicentric research (2001) published by Vergote indicates grading, patient's age and disruption of the tumour's capsule before the operation as factors of bad prognosis [15].

### Uterine fibromas

In this case we should also remember about a possibility of malignant change. Indications to laparotomy are fast-growing myomas, suspicions in ultrasound image examination and dilapidated. Uterine myomas in postmenopausal period often coexist with pathological hyperplasia and endometrial carcinomas. Uterine tumours developed or growing after menopause are rarely myomas. In the case of non-suspicious symptomatic uterine myomas there are several techniques of laparoscopic hysterectomy depending on concomitant pathologies. Current AAGL Classification (American Association of Gynecologic Laparoscopists) ranks these types of operation by procedure's range, which can be undertaken in a vaginal or laparoscopic way [5]:

### *Supracervical Laparoscopic Hysterectomy – SLH*

Indicated in symptomatic myomas, adenomiosis, or eventually in large metrorrhagia/heavy uterine bleeding that is not reacting to conservative treatment after excluding atypia. Procedure's technique consists of cutting off round ligaments, suspensory ovarian ligaments or proper ovarian ligaments, intersecting both laminas of broad uterine ligaments, obliteration of uterine arteries and cutting off uterus body from cervix. With the use of morcellator uterus is removed from abdominal cavity. It is recommended to dose contrast stain to abdominal cavity

before the procedure to simplify identification of endometrium. In postmenopausal patients earlier excochleation of the uterus is considered to be more precise [16].

### **Laparoscopic Assisted Vaginal Hysterectomy – LAVH**

Indications are similar to those for SLH, but can be also widened by cervix pathologies (for example dysplasia or early stage neoplasia). Procedure's technique consists of hysterectomy, mainly intravaginal but also with laparoscopic help. Uterine arteries, cervical ligaments of the uterus and uterosacral/sacrotuberous ligaments are cut off mostly by transvaginal access and only proper and suspensory ovarian ligaments are cut off laparoscopically. Cutting of vascular bundles in laparoscopic way is more difficult than transvaginally [16].

### **Total Laparoscopic Hysterectomy – TLH**

List of indications to TLH is the same as to LAVH. Range of this procedure includes body and cervix of the uterus and also non-malignant changes in uterine appendages. It is recommended especially for women who have borne a child. In this case transvaginal access is impeded. TLH is technically more difficult than LAVH. All stages of the procedure are laparoscopically proceeded. Laparoscopy is used in cutting off uterus from vaginal vaults and preparation is removed with use of morcellator or transvaginal; vaginal stump is stapled from intra-abdominal or vaginal side. This kind of procedure requires use of uterine manipulator. A 90 degree rotations can be undertaken according to a distal arm, placed in uterine cavity. That allows choosing optimal exposition of uterus during procedure. Manipulator's ceramic neck placed in vagina exposes vagina walls and enables safe incision with monopolar electrode [16].

The main group of patients that is qualified to LAVH are women with a good vaginal access or multiparas, whilst to TLH mostly patients with tight vagina and nulliparas. TLH requires more experienced operators than LAVH [17].

Laparoscopic hysterectomy (LH) and vaginal hysterectomy (LH) for benign pathology were compared in the research undertaken by Candiani et al. (2009) Laparoscopic hysterectomy results in a shorter hospital stay ( $2.7 \pm 0.5$  days vs.  $3.2 \pm 0.6$  days;  $p < 0.001$ ), less blood loss ( $83 \pm 57$  ml vs.  $178 \pm 149$  ml;  $p = 0.004$ ) and less postoperative pain compared with vaginal hysterectomy [18].

### **Endometrial carcinoma**

Laparoscopic surgery seems to be also the standard of surgical treatment for obese women with endometrial cancer carrying additional serious co-morbidities [19].

First use of laparoscopy in endometrial carcinoma is dated in 1992, when Childers and Surwit published their report about a new laparoscopic-transvaginal procedure in two cases [20]. This disease concerns mainly women between 5<sup>th</sup> and 7<sup>th</sup> life decade. In 80% of situations carcinoma is detected in 1<sup>st</sup> degree of clinical advancement, when changes are restricted to endometrium. The range of the procedure should include total hysterectomy with adnexa, swabbing from peritoneum and ilio-obturator lymphadenectomy. With high precision optics and view zooming, laparoscopic procedures provide a wide insight in abdominal cavity and give perfect conditions to surgical and pathological evaluation according to FIGO recommendations [16].

In research undertaken by Scribner et al. among 125 patients with endometrial carcinoma in the 1<sup>st</sup> degree of clinical advancement (67 operated in laparoscopic way, 45 in whom laparotomy was undertaken, 13 over 77 years old with transvaginal procedure because of contraindications to traditional operation) conviction that advanced age is a contraindication to laparoscopic procedure was disproved. Laparoscopic lymphadenectomy is as precise as transabdominal or may be even more due to surgeon dexterity. Lower blood loss, lower infectious complications, lower postoperative intestinal obstructions were observed after laparoscopy. Also the time of hospitalization was shorter [21].

Tozzi et al. analysed a group of 122 patients with endometrial carcinoma. In 63 of them laparoscopy was undertaken, in 59 laparotomy. The quantity of intraoperative complications was 4.7% in the case of laparoscopy versus 15.2% in the case of laparotomy. Age over 65 years old predisposed to complications. In 1/3 patients it was connected with the coexisting disease. In this group authors suggest Laparoscopic Assisted Vaginal Hysterectomy (LAVH) or Total Laparoscopic Radical Hysterectomy (TLRH) as a standard [19]. Placing manipulator in vagina is not contraindicated in cases of endometrial carcinoma.

The research undertaken by Siesto et al. (2010) on a group of 108 patients [divided in two groups: older (>65 years old, 48 women) and younger (<65 years old, 60 women)] undergoing surgery for endometrial cancer indicates that laparoscopy seems to be feasible and safe in older women with endometrial cancer [22].

In the case of neoplastic diseases of female reproductive organs many researchers underline the possibility of using laparoscopy and admit that it can be safely used in elderly women. Futhner et al. compare mortality and morbidity rate in patients over 65 years old after radical hysterectomy with lymphadenopathy and younger in early stages of cervical carcinoma IB or IIA. Similar research was undertaken among 186 patients (over 65 years old and less than 50 years old) by Geisler et al. Both researchers have not ascertained a difference in mortality and postoperative morbidity [1].

## Conclusions

Patients over 65 years old are important and numerous in a group with pathologies of female reproductive organs demanding operative treatment.

Laparoscopy as a minimal invasive procedure has a relevant position in gynaecological surgery in patients in every age. In elderly patients it is a particularly beneficial procedure in the case of non-suspicious adnexa' tumours and should be firstly chosen as a procedure consenting to minimize postoperative complications [3]. This procedure is connected with lower blood loss and hospital stay and is a good alternative to laparotomy in older women undergoing gynaecological abdominal procedures [23]. Of course in the case of finding malignant lesions there is necessity to prepare the whole oncological protocol.

The differences between laparoscopic procedures undertaken in older and younger patients are mostly: apneumatical access to the abdomen or use pneumoperitoneum with values lower than 10 mm Hg, operations undertaken with attitude to pathological tissue or organ, avoiding widening procedures' range if there is no malignant lesion, use lower Trendelenburg's position (or without). It is important to remember that the risk of malignant changes in elderly women is increased, that way it is necessary to examine it intraoperatively and use Doppler-USG image. Because of a higher risk of thrombo-embolic complications than in a younger population faster mobilization is significant what is possible after this kind of operations. Laparoscopic procedures are also connected with a lower quantity of analgesics used during and after the operation, what is important because of its influence on many human systems. Also because of small incisions there is a lower risk of wound infection.

Although use of the laparoscopic procedure in elderly patients has many benefits it is important to remember that it might be not a completely safe procedure for all. It increases mainly the risk of cardiovascular disorders but also is connected with a higher risk of postoperative organs insufficiencies. That way it is significant to choose patients properly for this procedure and undertaken the procedures in appropriate way in surgical centres with practised personnel [9, 10].

Currently there are no standards, which can qualify or disqualify elderly patients from laparoscopy as a way of operation. Often coincidence of diseases pertaining to internal medicine influences different procedure during laparoscopy in elderly women.

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