Impact of age on surgical staging and approaches (laparotomy, laparoscopy and robotic surgery) in endometrial cancer management

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ABSTRACT

Objective: This study aims to evaluate the different surgical approaches, perioperative morbidity and surgical staging according to age in patients with endometrial cancer.

Methods: Multicentre retrospective study. Cancer characteristics and perioperative data were collected for patients surgically treated for endometrial cancer. The patients were divided into 2 groups according to their age: younger or older than 75 years.

Results: Surgery was performed on 270 women < 75 years old and on 74 ≥ 75 years old. Minimally invasive surgery was performed less often in the elderly compared with their younger counterparts (58.2% vs. 74.8%; p=0.006). Independently of the surgical approach, the rate of pelvic and para-aortic lymphadenectomy was lower in women older than 75 years old than their younger counterparts (52.7% vs. 74.8%; p< 0.001; 8.1% vs. 21.8%; p= 0.007 respectively). According to the guidelines, more frequent surgical understaging was seen in the elderly compared with the younger (37% vs. 15.2%; p=0.002). In the comparison of complications for each surgical approach, there was no statistical difference in the ≥ 75-year-old age group in terms of intra- or postoperative complications between the laparotomy, laparoscopy or robotic surgery group. We found a shorter length of hospital stay for the women who underwent laparoscopy or robotic surgery compared with laparotomy (p<0.0001).

Conclusion: Elderly women with endometrial cancer are often surgically understaged whereas there is no evidence of greater perioperative complications than for their younger counterparts. They should benefit from minimally invasive surgery and optimal surgical staging to the same extent as younger women.

Keywords: endometrial cancer, surgical approach, elderly, surgical staging

INTRODUCTION

Endometrial cancer is the fourth leading cancer among women in Western countries with 54,870 new cases per year responsible for 10,170 annual deaths in the United States of America (USA) and 7,200 new cases per year in France, making it the fifth leading cause of death from cancer in women. It occurs mostly after the menopause with an average age at diagnosis of 68 years. With the ageing population, an increased incidence of endometrial cancer is observed (1). Interestingly, the National Institute of Aging predicts that there will be more than 150 million people over 65 in 2050, corresponding to 16% of the overall population with a strong trend towards an increasing percentage of female in the USA (2). Surgical management of endometrial cancer is therefore set to increase in the coming years. The International Federation of Gynaecology and Obstetrics (FIGO) (3), the European Society of Gynaecological Oncology (ESGO) and the European Society of Medical Oncology (ESMO) (4) support surgical staging for patients with endometrial cancer, particularly those with high-risk types for which they recommend a surgical lymphadenectomy. Laparotomy is the traditional surgical approach but minimally invasive techniques have played an increasing role in this indication and we now know that laparoscopic surgical staging of endometrial cancer is entirely feasible for a well-trained surgeon (5). However, few data are available in the elderly population especially as they are under-represented in clinical trials (6). This lack of participation has hampered the development of standardised treatment guidelines for the elderly based on the best available evidence. Surgeons and anaesthesiologists are often reluctant to perform minimally invasive surgery (laparoscopy or robotic surgery) on the elderly because of the effects of Trendelenburg positioning and hypercapnia due to pneumoperitoneum in a population with severe cardiopulmonary and respiratory comorbidities.

The aim of this study was to evaluate the different surgical approaches, perioperative complications and surgical staging according to age in patients with endometrial cancer.

MATERIALS AND METHODS

Patients

A retrospective data collection was carried out on patients with endometrial carcinoma surgically treated by laparotomy, laparoscopy and robot-assisted laparoscopy in two tertiary centres (Rennes teaching hospital and Institut Paoli Calmettes in Marseille, France) between January 2006 and December 2014. Patients were divided into 2 cohorts: 1) women < 75 years old, 2) women ≥ 75 years old.

The endpoints were surgical staging compliance with French National guidelines (7) and perioperative outcomes, including complications and length of postoperative hospital stay.

Data collection

Demographic and clinical data including age, body mass index (BMI), previous abdominal or pelvic surgery, American Society of Anesthesiologists (ASA) score and comorbidities were collected. We also recorded the tumour histological subtype, grade and stage based on the 2009 International Federation of Gynecology and Obstetrics (FIGO) classification (for patients treated from 2009 onwards) (3). Operative data including surgical approach, operative time (from first skin incision to skin closure), estimated blood loss (difference between pre- and postoperative haemoglobin levels) and operative procedure (lymphadenectomy, omentectomy) were collected. Other procedures corresponded to surgical procedures that were necessary but unrelated to surgical management of the endometrial

cancer such as colectomy, appendectomy, splenectomy, cholecystectomy or adhesiolysis. We also recorded the length of hospital stay and peri- and postoperative complications according to the Clavien-Dindo classification (8). We defined minor complications as grade I and II complications from this classification and major complications as grade III or IV. A congruent surgical staging system was defined according to the French National Cancer Institute guidelines based on FIGO stage and histological subtype. When patients did not undergo the recommended surgery (no lymphadenectomy or omentectomy performed) they were considered as "understaged". If they underwent more surgical procedures than recommended they were considered as "overstaged".

Surgical technique

Open surgery, laparoscopic and robotic procedures were performed by 5 primary surgeons (E.L., G.H., F.F., J.L. and V.L.). All patients received per-operative prophylactic antibiotics and post-operative prophylactic thromboprophylaxis in the form of subcutaneous heparin 5000 UI.

The combination of FIGO 2009 stage, type and grade enabled stratification of the tumours into recurrence risk groups as determined by the definition of the European Society for Medical Oncology (ESMO) (9) (10). Low risk was defined as stage IA, grade 1 or 2, histological type 1; intermediate risk consisted of stage IA, grade 3 and stage IB grade 1 or 2, histological type 1; high risk encompassed stage IB, grade 3 and by extension stage $\geq$ II histological type 1, all type 2 tumours irrespective of stage and also all those with lymphovascular emboli irrespective of type or stage (consistent with the policy of the French gynaecologic oncology tumour board). All patients underwent a total hysterectomy and bilateral salpingo-oophorectomy. Intermediate-risk patients also underwent bilateral pelvic lymphadenectomy (iliac and obturator nodes). High-risk patients underwent bilateral pelvic

lymphadenectomy (iliac and obturator nodes), a para-aortic lymphadenectomy up to the left renal vessels and infracolic omentectomy.

Statistical analysis

Descriptive parameters were expressed as a mean (± standard deviation [SD]) (and median [range] when indicated). We compared the demographic and medical characteristics of patients in the open surgery cohort, laparoscopic cohort and robotic surgery cohort using Chi-square or Fisher's exact tests, as appropriate, for categorical or ordinal variables, and unpaired *t*-test analysis for continuous variables. Only p values <0.05 were considered as statistically significant. Multivariate analysis was performed using logistic regression with SEM® (Statistics Epidemiology Medicine) software.

RESULTS

Between January 2006 and December 2014, 344 patients were surgically treated for endometrial cancer: 270 women were < 75 years old and 74 were ≥ 75 years old. The demographic and clinical data are shown in Table 1. The older women were thinner than the younger ones (BMI = 27 ± 6.5 vs. 29.9 ± 8.3; p=0.001). The number of medications, comorbidities and ASA grade ≥ 3 rates were significantly higher in the older group (p=0.03; p=0.001 and p< 0.001 respectively) (table 1). The histological and pathological features of endometrial cancer are shown in Figure S1. Tumour stage, grade and histological subtype were not statistically different between the 2 age groups.

Concerning the surgical approach (Table 2), our data show significantly less minimally invasive surgery in the elderly compared with their younger counterparts (58.2% vs. 74.8%; p=0.006) although the number of conventional laparoscopy or robot-assisted laparoscopy procedures was not statistically different between the 2 age groups. The elderly women underwent more laparotomy procedures than the younger ones (35.1% vs. 22.3%; p=0.03).

Surgical data and perioperative complications for all surgical approaches are shown in Table 3 according to age. Mean operative time was significantly shorter in the elderly group in comparison to the younger group (143 min ± 70 vs. 195 min ± 80; p<0.001). There was less estimated blood loss in the older group (1.4 ± 0.8 g/dL vs. 1.9 ± 1.4; p=0.008). The rate of pelvic and para-aortic lymphadenectomy was lower among women over 75 years compared with their younger counterparts (52.7% vs. 74.8%; p<0.001; 8.1% vs. 21.8% p=0.007 respectively), but when lymphadenectomy was performed the mean number of removed or positive lymph nodes was similar in the 2 groups. We found no statistical difference in the rate of omentectomy or other surgical procedures in the 2 age groups. We also observed more surgical understaging in the elderly group compared with the younger one (37% vs. 15.2%; p=0.002) whereas there was no statistical difference in overstaging or congruent staging between the 2 groups. Our data showed no statistical difference in terms of length of hospital stay or transfusion between the 2 age groups. There was a higher rate of conversion (laparoscopy to laparotomy) in the younger group than in the older one (10.5% vs. 4.6%; p=0.02). Conversions are mainly due to respiratory intolerance or major adhesiolysis. No statistical difference was observed in the rate of intra- or postoperative complications between the elderly patients and their younger.

When comparing the data for each surgical approach according to age (Table 4), there were fewer transfusions in the older group that in the younger group when women underwent

a laparotomy (7.6% vs. 31.6%; p=0.02). Concerning the laparoscopic surgical approach, we observed a longer length of hospital stay for the older women than the younger ones (5.2 ± 2.2 vs. 7.2 ± 4.4; p=0.02) whereas there were fewer intraoperative complications in this group (14.9% vs. 0%; p= 0.02). These complications occurring in the younger group were mostly classified as "other complications" meaning that 5 laparoscopic procedures were stopped due to respiratory intolerance and 6 due to extensive adherences. When we compared complications for the robotic surgical approach, no statistical difference was observed between the 2 age groups.

The comparison of complications according to surgical approach in the < 75-year-old group is provided in Table 5. We observed a shorter length of hospital stay and less transfusions for women who underwent laparoscopy or robotic surgery compared with laparotomy (both p<0.001). The rate of vascular, urinary or other complications was higher in the laparotomy group (p=0.001; p=0.006; p=0.02 respectively) whereas there was only a statistic tendency to less overall intraoperative complications in the 3 surgical approach groups (p=0.07).When we compared in pairs the laparotomic approach or the laparoscopic approach to the robotic one, we found significantly less intraoperative complications for the robotic approach (p=0.04, data not shown). Our data showed a higher rate of grade 2 postoperative complications in the laparotomy group compared with the other surgical approaches (p=0.004).

The same comparison was done for the ≥ 75-year-old group (Table 5) and no statistical difference was observed for intra- or postoperative complications between the 3 groups. Our data merely showed a shorter length of hospital stay for women who underwent laparoscopy or robotic surgery compared with laparotomy (p<0.001).

In multivariate analysis, only other surgical procedures (colectomy, splenectomy, appendectomy, cholecystectomy, adhesiolysis) were significantly associated with

perioperative complications (p<0.001) (Figure S2). Concerning postoperative complications, in the multivariate analysis the laparotomy surgical approach was the primary complication risk factor (p=0.002) and the performance of pelvic lymphadenectomy was the second one (p=0.03). In the multivariate analysis, age over 75 years was not associated with postoperative complications (Figure S3).

DISCUSSION

This study shows that elderly women with endometrial cancer do not receive the recommended surgical staging and have less minimally invasive surgery than their younger counterparts. They are more often understaged and not considered for lymphadenectomy regardless of the surgical approach, whereas understaging could lead to incorrect adjuvant treatment in these patients. However, elderly women want the same treatment as their younger counterparts and are equally desirous of optimal surgery (11). But, elderly women are surgically understaged. Yet despite significantly higher comorbidity rates consistent with literature findings (12-15), our study showed no more intra- or postoperative complications in the older group.

Women over 65 years old account for almost two-thirds of new cancer diagnoses and three-quarters of all cancer-related deaths (12) (13). Despite this trend, data focused on practice with elderly populations in the context of endometrial carcinoma (the most common gynaecological cancer in developed countries) remains scarce (11) (14-19).The majority of elderly patients are treated with traditional open surgery and a smaller percentage with vaginal or laparoscopic surgery. Despite the high rate of minimally invasive surgery in patients over 75 years old in this study (58%) because of our well-trained teams, we still observed a lower rate of minimally invasive surgery in the elderly when compared with younger patients. Even

if minimally invasive surgery is performed less often in the elderly, elderly patients derive similar benefits to those observed for younger patients. Like other authors (14-19), we observed fewer intraoperative complications, a shorter length of hospital stay and fewer transfusions with the laparoscopic approach and robotic surgery in the elderly group when compared with those undergoing open surgery. This lower rate of complications in patients of all ages should lead to consideration of minimally invasive surgery for all women, regardless of their age.

Moreover, our study raises the issue of surgical understaging of elderly women in current practice. This finding is not justified by surgical difficulties due to patient morphology as, like other authors, we show that elderly endometrial cancer women are thinner than younger ones (13) (14) (16) (17). Besides, our results do not show any statistical difference in terms of endometrial cancer histological subtype, grade or FIGO stage between the 2 age groups. Some literature data even report more aggressive endometrial cancer in elderly women, with more serous tumours (12) (18), more advanced FIGO stages (12) (16) or higher histological grades (11) (13) (16). The literature data also show that elderly women have poorer disease-free-survival rates (19) (20) (21) (22) and higher 5-year recurrence rates compared with younger patients (18) (22) (23). These poorer survival rates are related to cancer aggressiveness but could also be related to surgical understaging or adjuvant treatments. Indeed, a question remains unanswered in this study and in the literature: for an equal histology, is that survival differs between elderly and young women? If it is, there is therefore a need for adequate surgical staging for elderly patients with endometrial cancer, with lymphadenectomy performed according to the established guidelines in order to regain a prognosis similar to that of younger patients. This warrants more aggressive surgical staging in elderly endometrial cancer patients with greater use of minimally invasive surgery in order to reduce perioperative morbidity. In fact, it seems, the medico-surgical team is less likely to practice aggressive

treatments on elderly women. Maybe, this reluctance is due to a lack of an adequate definition of an old person? Hence, better than age, the actual concept of frailty is adopted by geriatricians and corresponds to a reduction in physiological reserves limiting the patient's capacity to respond to a stress and predisposing him/her to adverse events (23). This definition, adapted for surgery, could help anaesthesiologists and surgeons to take decision about the kind of surgery to practice, thanks to the development of surgical specific oncogeriatric scores. Thereby, in the surgical specific domain, it has been established that preoperative frailty in elderly women, defined by the Fried's Frailty Criteria, is predictive of postoperative morbidity (postoperative complications and rehospitalisation within the 30 days) (24). This tool is unfortunately too time-consuming (approximately 20 min) and is not currently used. In order to improve the surgical management of elderly women, it is necessary to develop better oncogeriatric scores than these currently available (25). Indeed, if medico-surgical teams do not treat equally older women because of morbidities, this different treatment must be based on objective criteria, which is not the case today.

Otherwise, we wonder if there is an interest to treat older women differently than younger women? To date, any publication, except Benedetti's one (22), proves there is an interest to understaged older women. In this way, we currently have no arguments to not treat elderly women as younger women. If not, the guidelines should change. In this context, endometrial cancer staging by sentinel lymph node detection may represent an interesting alternative, particularly in this sub-population. In fact, this surgical technic is safe and provide less morbidity compared with lymphadenectomy (26). However sentinel lymph node detection in endometrial cancer remains controversial. The technic is not yet standardised because of a lack of survival evidence. On the other hand, the therapeutic role of systematic lymphadenectomy is controversial. Indeed, some recent trials negate the therapeutic role of systematic lymphadenectomy (27) (28).

Nevertheless, known lymph node status remains crucial in order to tailor adjuvant treatment especially in high-risk endometrial cancer, more frequent in elderly (29) (30). There is still a need of randomised control trials but the literature data suggests it could be beneficial mostly in a frailty population Sentinel lymph node biopsy could resolved the question of node status in endometrial cancer because answers lymph node involvement with fewer morbidity (31) (32).

Finally, our study has limitations that should be recognised. First, this is a retrospective study, but there is a paucity of prospective data on this subject in the literature. Despite its retrospective nature, this study represent a large cohort on the subject, with 344 patients included and 74 patients over 75 years old, which represents 21% of the whole population and serves to support the reliability of our results. We also collected data from 2 recognised centres, both of which perform a large number of gynaecologic oncology procedures according to the established guidelines and implement similar practices, which contribute to the power of our study. Nevertheless, one recent study published by Uccella et al (15) had more power compare to the present study. Indeed, their cohort showed 1606 patients, 271 of whom over 75 years and 113 over 80 years and showed that the risk of wound complications, bowel lesions and overall perioperative complications are higher among elderly subjects compared to younger one. Present study can note this point, probably because of lack of power. Moreover, one interesting aspect of the study is the simultaneous comparison of the 3 surgical approaches, which is not often observed in the literature. Indeed, we showed better outcome with robotic surgery when compared with laparoscopic: length stay is lower, less post-operative complications but only for young patients and not for elderly, probably due to lack of power.

CONCLUSION

The present study shows elderly women with endometrial cancer do not receive the recommended surgical staging and have less minimally invasive surgery than their younger counterparts. Adequate surgical staging is necessary for elderly patients with endometrial cancer, with lymphadenectomy performed according to the established guidelines in order to regain a prognosis similar to that of younger patients. This more aggressive surgical staging in elderly endometrial cancer patients warrants greater use of minimally invasive surgery in order to reduce perioperative morbidity. There is a huge need for guidelines according age to manage correctly endometrial cancer patients.

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The authors have no conflict of interest to declare.

Contribution to autorships:

-Dr Bourgin: writer, statistical analysis, data collection

-Pr Houveneaghel, Dr Lambaudie: Surgeons at the Institut Paoli Calmettes, Marseille, France. They have operated patients with endometrial cancer and they have accepted to give us their database.

-Pr Levêque, Dr Foucher: Surgeons at CHU Rennes, France. They have operated patients with endometrial cancer and they have accepted to give us their database

-Pr Lavoué: co-writer, designer of the study, surgeon at CHU Rennes, France.

All authors participated in the design of the study. VL and CB carried out the data analysis and wrote the first draft of the manuscript. VL is a guarantor of the study. All authors (CB,

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Figure S3: *Multivariate analysis for postoperative complications*

Table 1: *Demographic and clinical characteristics*

	< 75 y N = 270	**≥ 75 y N= 74**	***p* value**
Age	63.5 [22-74]	80 [75-89]	< 0.001
BMI	29.9 ± 8.3	27 ± 6.5	0.001
Parity	2.2 ± 1.8	2.5 ± 2.5	NS
No. of medications	2.7 ± 2.5	4.2 ± 2.4	0.003
No. of diseases	1.3 ± 1.3	1.8 ± 1.6	0.05
Previous abdominal or pelvic surgery	165 (61.1%)	41 (55.4%)	NS
ASA score ≥3	39 (14.4%)	25 (33.8%)	< 0.001
Comorbidities *	174 (64.4%)	62 (83.8%)	0.001
Hypertension	117 (43.3%)	49 (66.2%)	
CVD/strokes	58 (21.5%)	29 (39.2%)	
Diabetes	40 (14.8%)	11 (14.8%)	
CLD/CGD	37 (13.7%)	4 (5.4%)	
2nd malignancy	40 (14.8%)	15 (20.3%)	

y: years old; BMI: Body Mass Index (kg/m^2); ASA: American Society of Anesthesiologists; NS: Not Significant; * Comorbidities including: Cardiovascular Diseases (CVD), Chronic Lung Diseases (CLD), Chronic Gastrointestinal Diseases (CGD)

Table 2: *Surgical approaches*

	< 75 y N = 270	**≥ 75 y N= 74**	***p* value**
Minimally invasive surgery	202 (74.8%)	43 (58.2%)	0.006
Laparoscopy	127 (47%)	27 (36.5%)	NS
Robotic surgery	75 (27.8%)	16 (21.7%)	NS
Laparotomy	60 (22.3%)	26 (35.1%)	0.03
Vaginal	8 (2.9%)	5 (6.7%)	NS

Table 3: *Surgical procedures and complications*

	< 75 y N = 270	**≥ 75 y N= 74**	***p* value**
Operative time (min)	195 (± 80)	143 (± 70)	< 0.001
Estimated blood loss (≠ Hb in g/dL)	1.9 (± 1.4)	1.4 (± 0.8)	0.008
No. of lymphadenectomies			
Pelvic	202 (74.8%)	39 (52.7%)	< 0.001
Para-aortic	59 (21.8%)	6 (8.1%)	0.007
No. of omentectomies	55 (20.4%)	8 (10.8%)	NS
Other procedures	75 (27.8%)	16 (21.6%)	NS
Total no. of lymph nodes	19.4 (± 10.2)	16.4 (± 10.8)	NS
No. of positive lymph nodes	0.8 (± 3.3)	0.2 (± 0.7)	NS
Surgical staging			
Understaging	24 (15.2%)	17 (37%)	0.002
Congruent staging	96 (60.8%)	22 (47.8%)	NS
Overstaging	38 (24%)	7 (15.2%)	NS
Hospital stay (d)	5.8 (± 3.5)	7.7 (± 6)	NS
Transfusions	28 (10.3%)	6 (8.1%)	NS
Conversion	21 (10.5%)	2 (4.6%)	0.02
Intraoperative complications	23 (8.5%)	4 (5.3%)	NS
Vascular	9 (3.4%)	3 (4%)	NS
Digestive	1 (0.3%)	0 (0%)	NS
Urinary	3 (1.1%)	0 (0%)	NS
Other*	10 (3.7%)	1 (1.3%)	NS
Postoperative complications**			
Minor	48 (17.8%)	10 (13.5%)	NS
Major	11 (4.1%)	6 (8.1%)	NS

y: years old ; Min: minutes; Hb: haemoglobin; No.: number; Other procedures: cholecystectomy, appendectomy, colectomy, splenectomy, adhesiolysis d: days; * Other: respiratory complications and morphological (obesity-related) surgical complications; ** postoperative complications according to the Clavien-Dindo classification

Table 4: *Surgical complications*

	< 75 y	≥ 75 y	*p* value
Laparotomy	**N=60**	**N=26**	
Hospital stay (d)	9.8 (± 4.3)	10.7 (± 7.9)	NS
Transfusions	19 (31.6%)	2 (7.6%)	0.02
Intraoperative complications	10 (16.7%)	2 (7.6%)	NS
Vascular	5 (8.3%)	1 (3.8%)	NS
Digestive	1 (1.7%)	0 (0%)	NS
Urinary	3 (5%)	0 (0%)	NS
Other*	1 (1.7%)	1 (3.8%)	NS
Postoperative complications**			
Minor	16 (26.7%)	5 (19.2%)	NS
Major	5 (8.3%)	1 (3.8%)	NS
Laparoscopy	**N=127**	**N=27**	
Hospital stay (d)	5.2 (± 2.2)	7.2 (± 4.4)	0.02
Transfusions	6 (4.7%)	1 (3.7%)	NS
Conversion	16 (12.6%)	0	NS
Intraoperative complications	19 (14.9%)	0	0.02
Vascular	1 (0.75%)	0	NS
Digestive	1 (0.75%)	0	NS
Urinary	0	0	NS
Other*	17 (13.4%)	0	0.04
Postoperative complications**			
Minor	15 (11.8%)	1 (3.7%)	NS
Major	4 (3.1%)	1 (3.7%)	NS
Robotic surgery	**N=75**	**N=16**	
Hospital stay (d)	3.7 (± 1.5)	4.5 (± 3.3)	NS
Transfusions	0 (0%)	0 (0%)	NS
Conversion	4 (5.3%)	0 (0%)	NS
Intraoperative complications	4 (5.3%)	0 (0%)	NS
Vascular	0 (0%)	0 (0%)	NS
Digestive	0 (0%)	0 (0%)	NS
Urinary	0 (0%)	0 (0%)	NS
Other*	4 (5.3%)	0 (0%)	NS
Postoperative complications**			
Minor	6 (8%)	1 (6.2%)	NS
Major	2 (2.6%)	0 (0%)	NS

y: years old ; d: days; *Other: respiratory complications and morphological (obesity-related) surgical complications; ** postoperative complications according to the Clavien-Dindo classification

Table 5: *Surgical complications according to surgical approach*

	Laparotomy	**Laparoscopy**	**Robotic**	***p* value**
Patients < 75 years old	**N=60**	**N=127**	**N=75**	
Hospital stay (d)	9.8 (± 4.3)	5.2 (± 2.2)	3.7 (± 1.5)	<0.001
Transfusions	19 (31.7%)	6 (4.7%)	0 (0%)	<0.001
Intraoperative complications	10 (16.7%)	19 (15%)	4 (5.3%)	NS
Vascular	5 (8.3%)	1 (0.8%)	0 (0%)	0.001
Digestive	1 (1.7%)	1 (0.8%)	0 (0%)	NS
Urinary	3 (5%)	0	0 (0%)	0.006
Other*	1 (1.7%)	17 (13.4%)	4 (5.3%)	0.02
Postoperative complications**				
Minor	16 (26.7%)	15 (11.8%)	6 (8%)	0.004
Major	5 (8.3%)	4 (3.1%)	2 (2.7%)	NS
Patients ≥ 75 years old	**N=26**	**N=27**	**N=16**	
Hospital stay (d)	10.7 (± 7.9)	7.2 (± 4.4)	4.5 (± 3.3)	<0.001
Transfusions	2 (7.7%)	1 (3.7%)	0 (0%)	NS
Intraoperative complications	2 (7.7%)	0	0 (0%)	NS
Vascular	1 (3.8%)	0	0 (0%)	NS
Digestive	0 (0%)	0	0 (0%)	NS
Urinary	0 (0%)	0	0 (0%)	NS
Other*	1 (3.8%)	0	0 (0%)	NS
Postoperative complications**				
Minor	5 (19.2%)	1 (3.7%)	1 (6.2%)	NS
Major	1 (3.8%)	1 (3.7%)	0 (0%)	NS

d: days; *Other: respiratory complications and morphological (obesity-related) surgical complications; **postoperative complications according to the Clavien-Dindo classification