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1 **Adherence to ESGO guidelines in obese patients with endometrial cancer and impact on**
2 **survival: a multicentric retrospective study.**

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46

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48

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59 draft preparation and supervised the project. C.T. conducted the original draft preparation
60 and supervised the project. Y.D. conducted the data analysis and supervised the project. All
61 the authors reviewed the manuscript and approved the final draft.

62

63 **Abstract**

64

65 **Objectives:** Obesity is known to be both a major risk factor for endometrial cancer and
66 associated with surgical complexity. Therefore, the management of these patients is a
67 challenge for surgeon and oncologist. The aim of this study is to assess the adherence to
68 ESGO guidelines in patients morbidly obese (BMI > 40 kg/m²). The secondary objectives
69 were the impact on overall survival and recurrence free survival.

70 **Methods:** All the patients who were treated for an EC in the 11 cancer institutes of the
71 Francogyn group were included and classified into 3 weight groups: morbid (MG) (BMI over
72 40kg/m²), obese (OG) (BMI between 30 and 40kg/m²) and normal or overweight (NOG)
73 (with a BMI under 30kg/m²). Adherence to guidelines was evaluated for surgical
74 management, lymph node staging and adjuvant therapies.

75 **Results:** 2375 patients were included: 1330 in NOG group, 763 OG group and 282 in MG
76 group. The surgical management of MG was in according with the guidelines in only 30% of
77 cases against 44% for OG and 48% for NOG (p< 0.001), especially because of a lack of lymph
78 node staging. MG were more likely to receive the recommended adjuvant therapy (61% for
79 MG, 52% for OG and 46% for NOG, p-value under 0.001).

80 Weight had no impact on OS (p-value=0.6) and MG patients had a better RFS (p =0.04).

81 **Conclusion:** Adherence to international guidelines for surgical management is significantly
82 lower in MG patients, especially the procedures of lymph node staging. However, MG
83 patients had more often the adequate adjuvant therapies. MG patients had a better RFS
84 probably because of better prognosis tumors.

85 **Keys message:**

86

87 **What is already known on this topic:** Obesity is a risk factor of endometrial cancer. Its
88 impact on the management of patients is however still debated.

89 **What this study adds:** The surgical management of patients with severe obesity is
90 significantly different than the guidelines. However, severe obese patients have a better
91 RFS and no impact was found on OS.

92 **How this study might affect research, practice or policy:** The development of robotic
93 surgery, the extension of SLN indications and the study of new biological markers might
94 improve the management of severe obese patients.

95

96 **Key words:** Endometrial cancer; severe obesity; clinical management; morbid obesity;
97 sentinel lymph node; minimally invasive surgery

98

99 **Introduction**

100
101 Endometrial cancer (EC) is the sixth most frequently diagnosed cancer in women,
102 with 417.000 new cases and 97.000 new deaths in the world in 2020(1). The increasing
103 number of cases in western countries could reflect the significant proportion of patients
104 with risk factors such as obesity(2). According to the WHO, patients with excessive body
105 mass index (BMI) over 25 kg/m² may represent two billions of people, or 30% of the world
106 population(3). In this population, the relative risk to develop an endometrial cancer is
107 ranging from 2.7 for patients with a BMI higher than 30 kg/m² to 4.7 for those with a BMI
108 higher than 35 kg/m²(2).

109 Surgery and adjuvant therapy for EC are determined according to ESGO-ESMO-ESTRO
110 guidelines(4). Many reports previously described the surgical complexity of managing obese
111 patients, usually at increased risk of post operative complications(5). Vargiu and al. recently
112 showed that obese patients were under-staged in 9.4% of cases (p=0.017) because of
113 sentinel lymph node (SLN) failure(6). Wissing M and al. showed that successful SLN or pelvic
114 lymphadenectomy (LND) correlated negatively with BMI levels (adjusted OR 0.86 CI95%
115 [0.76–0.97] for SNL and 0.76 CI95% [0.59–0.96] for LND, per 1 kg/m² increment)(7).

116 Likewise, dealing with severe obesity is a challenge for oncologists. Furlanetto et al.
117 showed in a prospective randomized trial that obese patients who received the real dose
118 dense chemotherapy according to their weight without adjustment had more severe
119 toxicities without impact on survival(8). In the same time, ESGO guidelines clearly advise full
120 dose chemotherapy to avoid under treated patients(9) .

121 In this context, clinicians always balance the need to offer obese patients the most
122 appropriate therapies with the significant increase in morbidity in this population.

123 The primary objective of this study was to assess the adherence to ESGO guidelines in
124 patients morbidly obese (BMI > 40 kg/m²). Our secondary objective included survival
125 analysis stratified by BMI categories.

126

127 **Methods**

128 *Population included*

129 The research protocol was approved by the institutional review board of the French College
130 of Obstetrics and Gynecology (2023 – GYN – 0108).

131 The inclusion was retrospective and multicentric, including 11 French tertiary cancer
132 institutions of the FRANCOGYN group: Creteil University Hospital, Jean Verdier University
133 Hospital, Lille University Hospital, Poissy University Hospital, Tenon University Hospital,
134 Tours University Hospital, Rennes University Hospital, Reims University Hospital, Clermont-
135 Ferrand University Hospital, Brest University Hospital, and Jean-Francois Leclerc Hospital.
136 Patients treated for an EC histologically proven between 2000 and 2020 in one of the
137 involved centers were selected.

138 Patients with BMI < 18 kg/m², advanced metastatic disease never operated, rare
139 tumors and incomplete anamnesis or follow up (lack of information on age, BMI or
140 histology) were excluded.

141

142 *Data collection*

143 The following data were abstracted from patients' chart: socio-demographic, BMI
144 (calculated as the weight in kilograms divided by the square of the height in meters, both
145 measured at the time of diagnosis, and expressed in kg/m²), parity, menopausal status, high
146 blood pressure, diabetes, hormone replacement therapy, history of breast cancer, FIGO
147 stage, final pathologic analysis and adjuvant therapy. The date of surgery, recurrence and
148 death were also reported.

149

150 *Patients' management*

151 Preoperative work-up included a digital vaginal and speculum examination,
152 ultrasound, and pelvic MRI to assess preoperative risk group. All patients managed before
153 the actualization of ESMO guidelines were re-evaluated to determine preoperative risk of
154 lymph node invasion.

155 Patients' management were theoretically based on ESGO guidelines (4) and
156 systematically validated in multidisciplinary committee including at least a radiologist, a
157 onco-gynecological surgeon, a pathologist, and a medical oncologist.

158 The surgical treatment consisted of a hysterectomy with bilateral salpingo-
159 oophorectomy(4,10). The lymph node staging of patients treated before 2016 was
160 considered to be in adequation with guidelines if patients underwent a pelvic LND or a SLN
161 for low-risk group and if it was associated with a lombo-aortic lymphadenectomy for
162 intermediate and high group risk(10). After 2016, the lymph node staging was concordant
163 only if a SLN was performed for low risk and a pelvic and lombo-aortic lymphadenectomy for
164 intermediate and high group risk(4).

165 Tumors were classified according to the FIGO 2018 classification after final pathologic
166 analysis(11).

167 Adjuvant therapy was assessed according to the postoperative group of risk of
168 recurrence(4).

169

170 *Evaluation of the adherence to guidelines*

171 The concordance of the surgical procedure and the indication of adjuvant therapy
172 was evaluated separately. The global management was considered to be concordant if the
173 surgical and the adjuvant therapy was concordant to guidelines.

174 In all centers, for patient with stages I or II cancer, the follow up visit was conducted
175 every six months for five years then every year with a simple clinical exam. For patients with
176 stage III or IV cancer, follow-up visits were conducted every 3 months for the first 2 years,
177 every 6 months for the following 3 years, and once a year thereafter.

178

179 *Statistical analysis*

180 Data were managed with an Excel database (Microsoft Corporation, Redmond, WA,
181 USA) and analyzed using SAS v9.4 (SAS Institute, Cary, NC, USA).

182 Patients were retrospectively divided into three groups according to their BMI:
183 normal, obese and morbid. "Normal or Overweight group" (NOG) included patients with a
184 BMI greater or equal than 18 and less or equal than 30. "Obese group" (OG) included
185 patients with a BMI higher than 30 but lower than 40. Eventually, "morbid group" (MG)
186 included grade 3 obesity, also known as severe obesity, defined as a BMI higher than forty.

187 Statistical analysis was based on Chi square and Fisher's exact tests for ordinal
188 variables. For continuous variables, Student's t test or Mann-Whitney test were used (p
189 values < 0.05 were considered significantly different). Recurrence free survival (RFS) was
190 defined as the time between surgery and relapse or the last follow up if no event occurred.
191 Overall survival (OS) was calculated from the date of surgery to death or the last follow up if
192 no event occurred. Patients who were still alive or without recurrence were censored at the
193 date of the last follow-up visit. The Kaplan-Meier method was used to estimate the survival
194 distribution and the log-rank test was used to compare survival data (p values < 0.05 were
195 considered significantly different).

196 In accordance with the journal’s guidelines, we will provide our data for independent
197 analysis by a selected team by the Editorial Team for the purposes of additional data analysis
198 or for the reproducibility of this study in other centers if such is requested.

199

200

201 **Results**

202 *Characteristics of the study population*

203 Between 2000 and 2020, 2852 patients were treated for an EC within one of the
204 centers involved and 2375 were selected for analyses (Figure 1). NOG patients represented
205 1330 patients, OG 763 patients and MG 282 patients.

206

207 The main characteristics of the patients are displayed in Table 1.

208 MG patients were significantly younger with a median age of 63 for MG, 66 for OG
209 and 68 for NOG (p-value < 0.001) and had more comorbidities as high blood pressure (181
210 (64%) MG patients, 392 (51%) OG patients, 445 (33%) NOG patients (p-value < 0.001)) or
211 diabetes (109 (39%) MG patients, 188 (25%) OG patients and 131 (10%) NOG patients (p-
212 value < 0.001)).

213 MG patients had less aggressive tumor than OG or NOG patients. Endometrioid carcinoma
214 represented 238 (88%) MG tumors, 634 (85%) OG tumors and 1054 (81%) NOG tumors (p-
215 value= 0.002). Among them 150 (63%) were grade 1 for MG, 359 (57%) for OG and 555
216 (53%) for NOG tumors (p-value=0.005). Therefore, MG patients were more often classified in
217 low ESMO group than OG or NOG patients (141 (52%), 296 (40%) and 496 (38%)
218 respectively, p-value < 0.001).

219

220 *Adherence to guidelines according to BMI group.*

221 Adherence to guidelines according to BMI group are displayed in table 2.

222 MG patients were managed according to guidelines in 19% of cases (53 patients) against
223 24% of NOG or OG patients (322 and 182 patients respectively) (p-value = 0.138).

224 The surgical management of MG patients was more likely different from guidelines for low
225 and intermediate group risk than high group risk (Table 3).

226 The surgical route chose for low and intermediate group risk was more often laparoscopic
227 for NOG and OG. For MG patients open surgery was more often elected (p-value < 0.001).

228 MG patients had significantly less lymph node staging when indicated. 85 (30%) MG
229 patients had the recommended surgical management against 644 (48%) NOG patients and
230 355 (44%) OG patients (p-value < 0.001).

231 MG patients had less often SLN biopsy when required. Only 16 (11%) MG patients versus 70
232 (24%) OG patients and 153 (31%) NOG patients had a SLN in low group (p-value < 0.001 for
233 low risk and p-value=0.005 for intermediate). Furthermore, when it was performed, only 10
234 (63%) SLN was detected in MG patients versus 62 (89%) in OG and 137 (90%) in NOG (p-
235 value=0.008).

236 Pelvic LND was less often performed in MG patients at low and intermediate group risk. 24
237 (7%) MG patients versus 111 (57%) OG patients and 211 (65%) NOG patients had a pelvic
238 LDN in intermediate group (p-value=0.002 for intermediate and p-value < 0.001 for low risk).

239 In high group risk, there was no significant difference between weight groups for surgical
240 approach or pelvic lymph node staging. MG patients had less para-aortic lymphadenectomy
241 (16 (23%) MG patients, 90 (35%) OG patients and 197 (41%) NOG patients, p = 0.011).

242 In all weight groups, the weight had not impact on lymph node invasion on final pathology.

243

244 *Adjuvant therapy*

245 171 (61 %) MG patients were managed according to guidelines for adjuvant therapy
246 while only 396 (52%) OG patient and 618 (46 %) NOG patients had the adjuvant therapy
247 recommended (p < 0.001). In the sub-group analysis, no significative trend was observed.

248

249 *Survival analysis*

250 The survival curves are displayed in figure 2. Mean follow up was 40 months. MG
251 patients had a better RFS than OG and NOG ($p = 0.04$). No difference was observed in OS (p
252 $= 0.6$). Survival curves comparing morbid obese patients to the obese and non-
253 obese or overweight patients are displayed in Supplementary Figure 1.

254

255 **Discussion**

256 *Summary of main results*

257 In our retrospective multicentric cohort, we found that MG patients were more likely
258 to have an incomplete or inappropriate lymph node staging, even in low and intermediate
259 risk situations. Indeed, 70% of MG patients didn't have the recommended staging when only
260 56% of OG patients and 52% of NOG patients' staging were not in accordance to guidelines
261 ($p < 0.001$). However, the choice of adjuvant therapy was more often in accordance with
262 guidelines: 61% of MG patients and only 52% of OG patients and 46% of NOG patients ($p <$
263 0.001). MG patients had increased RFS when compared to OG or NOG ($p=0.04$), but without
264 significant impact on OS ($p=0.6$).

265

266 *Results in the context of published literature*

267 Severe obesity is associated with surgical complexity, especially for lymph node
268 staging. Vargiu et al. reported that obese patients ($BMI > 35 \text{ kg/m}^2$) were under-staged during
269 EC management in 9.4% versus 5% of non-obese patients ($p\text{-value}=0.017$). Moreover, there
270 was an empty package dissection in 8.2% of cases versus 3.9% for non-obese patients ($p\text{-}$
271 $\text{value}=0.022$)(6). Canlorbe et al. highlighted that nodal staging was performed for only 70%
272 of obese patient in high group risk against 90% of non-obese patients ($p\text{-value}<0.0001$) and
273 it was associated with a poorest RFS ($HR=12.5 \text{ CI}95\%[3.1-51.3]$)(12). In our cohort, MG
274 patients had significantly less lymph node staging, and this was even significant for pelvic
275 lymph nodes in the low and intermediate group risk. For high group risk, the difference was
276 observed on para-aortic staging ($p = 0.011$).

277 The generalization of SLN, especially for high-risk patients, might improve the lymph
278 node staging in patients with EC. The FIRES trial showed a sensitivity to detect node-positive

279 disease of 97.2% (CI95% [85.0-100]), and a negative predictive value of 99.6% (CI95% [97.9–
280 100]) even for high group risk(13). This procedure has been especially studied for obese
281 patient by Matanes et al. who showed that performing a SLN instead of a pelvic LDN for
282 obese patients is associated with a shorter operative time ($p < 0.001$) and less blood loss ($p =$
283 0.03) without impact on OS and RFS ($p = 0.7$ and 0.4 respectively)(14). SLN procedures in high-
284 risk obese patients could increase the proportion of patients benefitting from the
285 appropriate surgical and adjuvant therapies according to ESGO guidelines.

286 Regarding survival, the impact of obesity remains unclear. In a meta-analysis by
287 Kokts-Porietis RL and al, the increase of the BMI is associated with a higher cancer
288 recurrence and all-cause mortality but no impact was found on cancer specific mortality(15).
289 In our cohort, MG patients had a better RFS ($p = 0.04$) but without difference in OS between
290 weight group ($p = 0.6$). This difference in RFS could be explained by the fact that morbid
291 obesity seems to be associated with better prognostic tumors: more endometrioid
292 carcinoma, lower FIGO stage and therefore more low-risk group (p -value under 0.001). In
293 this group risk, the probability of lymph node invasion is lower so the lack of lymph node
294 staging had probably less impact on RFS.

295 MG patients were also younger than OG or NOG patients (median of 63, 66 and 68 years old
296 respectively, p -value under 0.001) which could impact positively OS.

297 The development of quality indicators by ESGO and the certification of care centers
298 might improve the adherence of international guidelines (16). Adherence to guidelines was
299 more important regarding the choice of adjuvant therapy in obese patients, without
300 significative difference after further stratification. The recent inclusion of the molecular
301 analysis including immunohistochemistry for p53, mismatch repair proteins, and DNA
302 sequencing for POLE exonuclease domain aim to tailor adjuvant therapies according to

303 specific subgroups. For example, simple clinical surveillance can be decided in POLE-mutated
304 patients(4). Vanessa M López-Ozuna and al. has already been working on finding molecular
305 predictive biomarkers for obese patients(17). Finding the molecular marker that enables to
306 avoid the surgical difficulties in this population seems to be the next big thing. In the present
307 cohort, the impact of molecular classification couldn't be evaluated because of the lack of
308 information for all patients due to our inclusion period.

309

310 *Strengths and weaknesses*

311 Some of the limits deserve to be mentioned. The retrospective nature of our work
312 could have biased the results. However, the large multicentric inclusion reflect the
313 difference of management of EC in several French cancer institutions.

314 Furthermore, due to the large time of inclusion (2000 to 2020), few patients have
315 been operated by robotic access. E. Kawai and al. showed that obese patients can safely
316 undergo robotic access surgery compared to non-obese patients with no more laparotomy
317 conversion (5% vs 3% p-value 0.619) or post operative complications (5% vs 9%, p-value
318 0.738). However, despite the use of robotic assisted laparoscopy, less obese patients
319 underwent pelvic lymphadenectomy (5 vs 12%, p-value=0.005)(18). Moreover, indications
320 for lymph node surgical staging evolved over the years with more patients eligible to less
321 morbid procedures such as SLN. However, a strength of this work was that the adherence to
322 guidelines was evaluated according to the year of management for each patient included.

323 Another lack of this study is the absence of information regarding post operative
324 complications. It remains possible that the occurrence of some complications had impact on
325 the decision to propose adjuvant therapies. Laparotomy surgical access is significantly
326 more chosen in MG population (22% of MG patients against 17% of NOG patients in low

327 group risk (p-value of 0.001); 45% of MG patients against 22% of NOG patients in
328 intermediate group risk (p-value of 0.001). Bouwman and al. showed that obese women had
329 significantly more postoperative surgical complication mainly if the access is open
330 surgery(5). Reijntjes et al. showed in a randomized trial that there were no significant
331 difference between laparoscopy or laparotomy surgical access on RFS (90.3% vs 84.1%
332 CI95% [0.31-1.52]) or OS (89.2% vs 82.8% CI95%0.30-1.19))(19).

333

334

335

336

337 **Conclusion**

338

339 Adherence to international guidelines for surgical management but not adjuvant
340 therapies, is significantly lower in morbid obese patients, especially the procedures of lymph
341 node staging.

342 Recent implementation of sentinel lymph node procedure even in high-risk patients as well

343 as the use of robotic procedures could increase the proportion of patients benefitting from

344 recommended therapies.

345

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347

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Table 1: Epidemiological and pre operative histological characteristics by body mass index in the whole population.

	NOG N=1330	OG N=763	MG N=282	p-value
Epidemiological charecteristics :				
Age, mean (median)	67 (68)	66 (66)	63 (63)	< 0.001
Body mass index, mean (median)	24 (24)	34 (33)	46 (46)	0.001
Menopause, n (%)	1223 (92%)	702 (92%)	250 (89%)	0.169
Menopausal hormone replacement therapy, n (%)	292 (22%)	87 (11%)	13 (5%)	0.001
High blood pressure, n (%)	445 (33%)	392 (51%)	181 (64%)	0.001
Diabete, n (%)	131 (10%)	188 (25%)	109 (39%)	0.001
Breast cancer history, n (%)	120 (9%)	52 (7%)	10 (4%)	0.004
Nulligravida, n (%)	402 (30%)	226 (30%)	89 (32%)	0.831
Histological charecteristics :				
Histological type, n (%)				0.002
<i>Endometrioid carcinoma</i>	1054 (81%)	634 (85%)	238 (88%)	
<i>Other type</i>	254 (19%)	114 (15%)	31 (12%)	
NA	22	15	13	
Histological grade, n (%)				0.005
1	555 (53%)	359 (57%)	150 (63%)	
2	361 (34%)	187 (30%)	72 (30%)	
3	138 (13%)	881 (14%)	16 (7%)	
NA	276	129	44	
FIGO stage, n (%)				0.149
IA	661 (51%)	368 (49%)	157 (58%)	
IB	376 (29%)	28 (29%)	70 (26%)	
II	84 (6%)	40 (5%)	14 (5%)	
IIIA	50 (4%)	23 (3%)	6 (2%)	
IIIB	7 (1%)	10 (1%)	0 (0%)	
IIIC	85 (7%)	57 (8%)	15 (6%)	
IV	45 (3%)	32 (4%)	7 (3%)	
NA	22	15	13	
ESMO group, n (%)				< 0.001
Low	496 (38%)	296 (40%)	141 (52%)	
Intermediate	486 (37%)	257 (34%)	70 (26%)	
High	326 (25%)	195 (26%)	58 (22%)	
NA	22	15	13	

Table 1: Epidemiological and pre operative histological characteristics by body mass index in the whole population.

MG, morbid group; NOG, non-obese overweight group; OG, obese group.

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Table 2: Adherence to guidelines according to weight group

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	NOG N=1330	OG N=763	MG N=282	p-value
Surgical procedure concordance, n (%) :				
	644 (48%)	355 (44%)	85 (30%)	< 0.001
Adjuvant therapy concordance, n (%) :				
	618 (46%)	396 (52%)	171 (61%)	< 0.001
Global adherence, n (%) :				
	322 (24%)	182 (24%)	53 (19%)	0.138

Table 2: Adherence to guidelines according to weight groups.

MG, morbid group; NOG, non-obese overweight group; OG, obese group.

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417 **Table 3: Surgical procedure by ESMO pre operative group risk of lymph node invasion and**
 418 **by body mass index.**
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ESMO group risk :	Low			p-value	Intermediate			p-value	High			p-value
	NOG N = 496	OG N = 296	MG N = 141		NOG N = 326	OG N = 195	MG N = 58		NOG N = 486	OG N = 257	MG N = 70	
Surgery												
Surgical route				< 0.001				< 0.001				0.121
Laparoscopy, n (%)	394 (79%)	226 (76%)	92 (65%)		247 (76%)	145 (74%)	24 (41%)		255 (52%)	118 (46%)	33 (47%)	
Open surgery, n (%)	86 (17%)	56 (19%)	31 (22%)		73 (22%)	36 (18%)	26 (45%)		211 (43%)	127 (49%)	29 (41%)	
Vaginal surgery, n (%)	11 (2%)	10 (3%)	15 (11%)		2 (1%)	8 (4%)	4(7%)		10 (2%)	5 (2%)	4 (6%)	
Robotic laparoscopy, n (%)	5 (1%)	4 (1%)	3 (2%)		4 (1%)	6 (3%)	4 (7%)		10 (2%)	7 (3%)	4 (6%)	
Sentinel lymph node procedure												
Performed, n (%)	153 (31%)	70 (24%)	16 (11%)	< 0.001	113 (35%)	56 (29%)	8 (14%)	0.005	69 (14%)	25 (10%)	6 (9%)	0.129
Detected, n (%)	137 (90%)	62 (89%)	10 (63%)	0.008	109 (96%)	51 (91%)	7 (88%)	0.249	56 (81%)	23 (92%)	6 (100%)	0.244
Positive, n (%)	10 (7%)	6 (10%)	2 (20%)	0.361	21 (19%)	8 (16%)	1 (14%)	0.831	15 (27%)	9 (39%)	1 (17%)	0.427
Pelvic Lymphadenectomy												
Performed, n (%)	271 (55%)	144 (49%)	31 (22%)	< 0.001	211 (65%)	111(57%)	24 (7%)	0.002	350 (77%)	179 (70%)	41 (59%)	0.07
Positive, n (%)	9 (3%)	2 (1%)	0 (0%)	0.316	15 (7%)	9 (8%)	2 (8%)	0.937	350 (77%)	179 (70%)	41 (59%)	0.07
Pelvic staging												
Performed, n (%)	327 (66%)	175 (59%)	45 (32%)	< 0.001	251 (77%)	130 (32%)	27 (47%)	< 0.001	359 (74%)	188 (73%)	45 (64%)	0.239
Positive, n (%)	15 (3%)	8 (3%)	2 (1%)	0.581	33 (10%)	16 (31%)	3 (5%)	0.429	99 (20%)	59 (23%)	13 (19%)	0.620
Lombo-aortic lymphadenectomy												
Performed, n (%)	39 (8%)	19 (6%)	1 (1%)	0.009	61 (68%)	27 (14%)	2 (3%)	0.009	197 (41%)	90 (35%)	16 (23%)	0.011
Positive, n (%)	5 (13%)	3 (16%)	0 (0%)	0.880	9 (15%)	2 (7%)	1 (50%)	0.197	56 (28%)	23 (26%)	6 (38%)	0.607

Table 3: Surgical procedure by ESMO pre operative group risk of lymph node invasion and by body mass index.

MG, morbid group; NOG, non-obese overweight group; OG, obese group.

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