

Abstract

Objectives

It is considered that single-port surgery should be performed by experienced surgeons because of the difficulties. In this study, we tried to identify the patients who were suitable for single-port laparoscopic adrenalectomy, focusing on the optimal cut-off values of the body mass index (BMI) and the visceral fat area / total fat area (VFA/TFA) ratio.

Methods

A retrospective study was conducted in 126 consecutive patients who underwent single-port adrenalectomy between 2009 and 2015. All operations were done via the transperitoneal approach, after a single access port was placed at the umbilicus with a 2.5 cm skin incision. The pneumoperitoneum time (PT) was employed as an objective index for the surgical difficulty.

Results

The statistical significant cut-off value for BMI is 24 kg/m². In 80 patients with a BMI less than 24 kg/m², PT was significantly shorter than in those whose BMI exceeded 24 kg/m² (78 vs. 94 minutes, p=0.038). Mean PT was 71 minutes in 27 patients with a BMI less than 20 kg/m², while mean PT was 118 minutes in 10 patients with a BMI exceeding 28 kg/m². Regarding the VFA/TFA ratio, the clear cut-off value was 0.4. PT was shorter in 65 cases with a VFA/TFA ratio less than 0.4 than the counterparts (78 vs. 91 minutes, p=0.056).

Conclusions

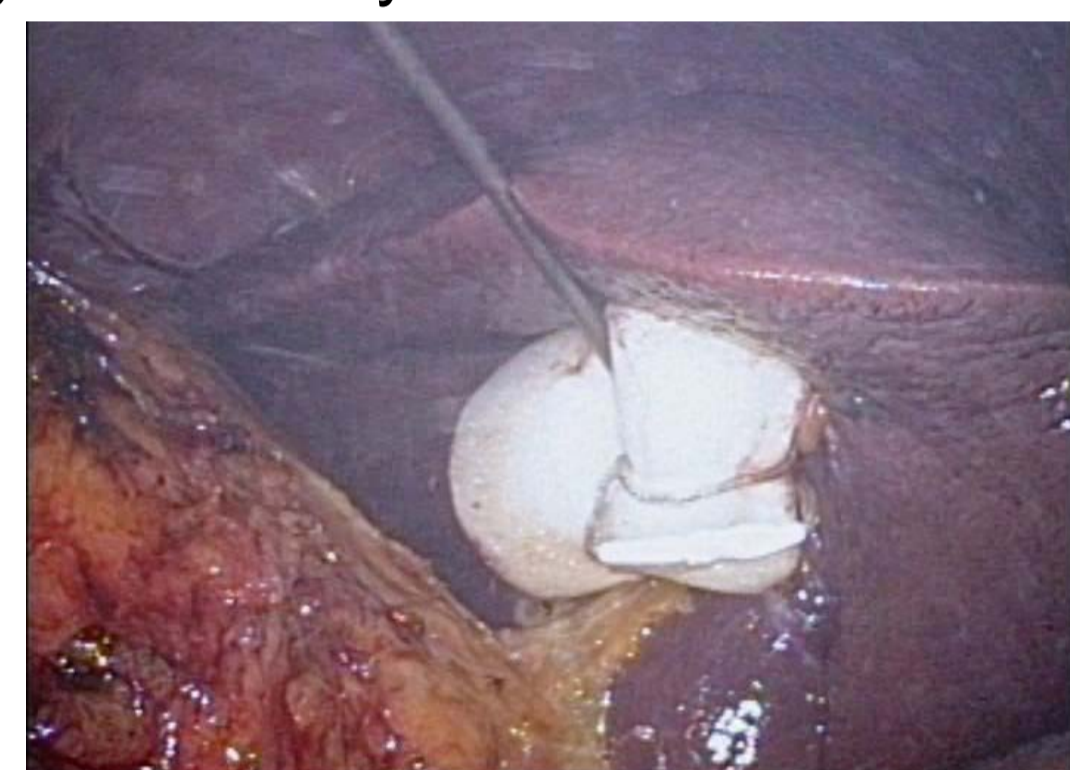
BMI is associated with the PT for single-port laparoscopic adrenalectomy. Patients with a BMI less than 20 kg/m² are thought to be suitable for novice surgeons. Conversely, even experienced surgeons should carefully consider performing single-port surgery in patients whose BMI exceeds 28 kg/m². The VFA/TFA ratio was also a predictor of the technical difficulty of single-port surgery, and its optimal cut-off value was 0.4.

Objectives

Laparoscopic adrenalectomy is the gold standard surgical technique for adrenal tumors. Recently, the single-port approach has attracted attention with evolution to less invasive surgery; the benefits include less postoperative pain, faster recovery, and better cosmetic results. It is considered that single-port surgery should be performed by experienced surgeons because of the difficulties associated with using specialized instruments through such limited access. In this study, we tried to identify the patients who were suitable for single-port laparoscopic adrenalectomy, focusing on the optimal cut-off values of the body mass index (BMI) and the visceral fat area / total fat area (VFA/TFA) ratio. It is hoped that the results will be useful for making decisions about the surgical approach to adrenal tumors and may increase the adoption of single-port surgery.



(SILS port)



(Liver traction)



(Flexible camera)



(flexible SILS clinch)



Total abdominal fat area (TFA) and visceral fat area (VFA), were measured at the level of the L4 vertebra by helical CT. Areas inside the blue and yellow lines are TFA and VFA, respectively.

Methods

A retrospective study was conducted in 126 consecutive patients who underwent single-port adrenalectomy between 2009 and 2015. Procedures were performed by two surgeons. Patients were situated in the flank position. All operations were done via the transperitoneal approach, after a single access port (SILS port) was placed at the umbilicus with a 2.5 cm skin incision. For right adrenalectomy, an additional 2-mm port was used for liver retraction. We used a 5 mm flexible camera, as well as flexible devices (SILS clinch and SILS hook) and energy devices (Enseel or Ligasure). The intact specimen was extracted using an EndoCatch bag. We retrospectively re-evaluated all of the medical records and surgical videos. TFA and VFA were measured at the L4 level on preoperative CT scans. The pneumoperitoneum time (PT) was employed as an objective index for the assessment of surgical difficulty.

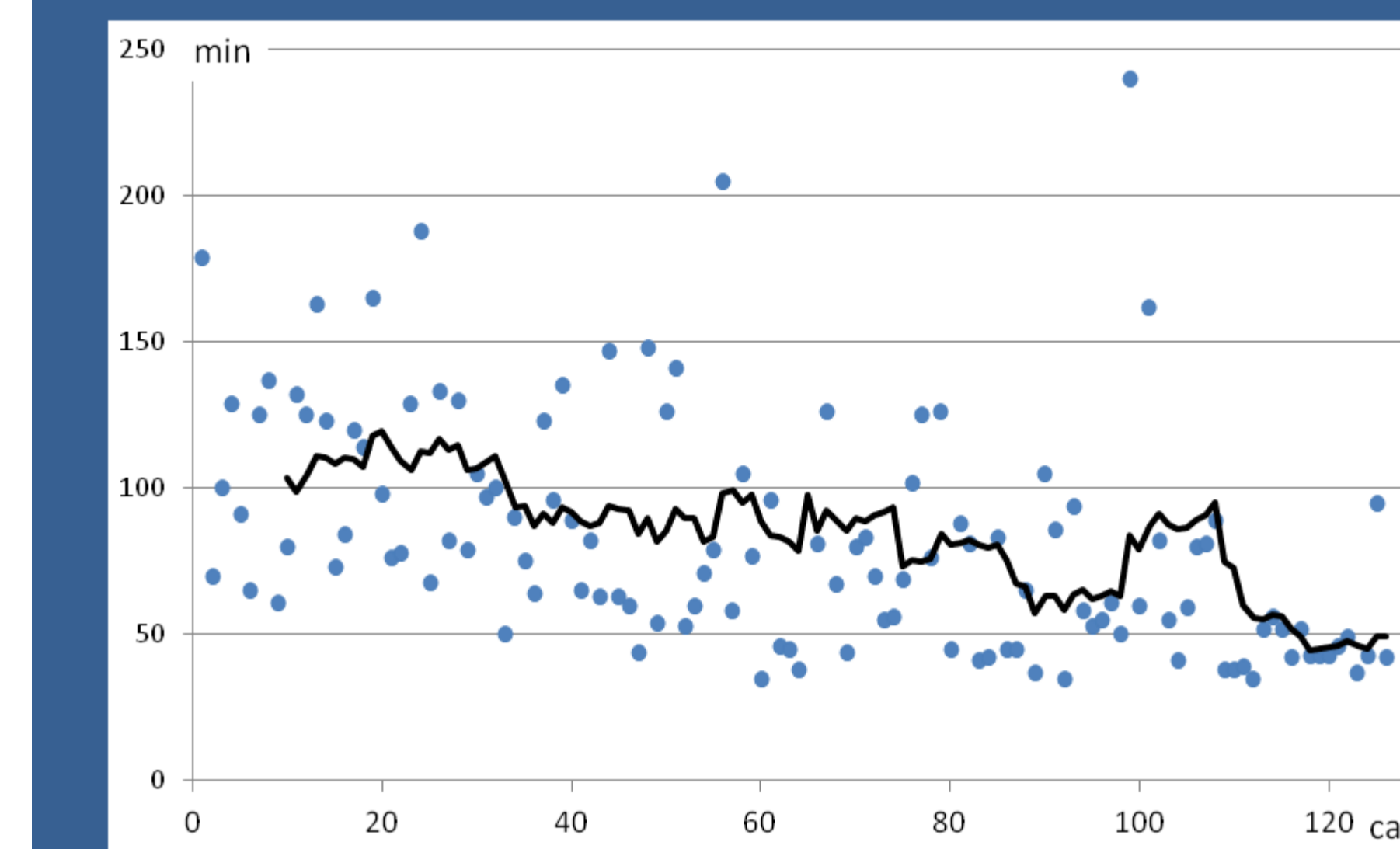
Results

Backgrounds

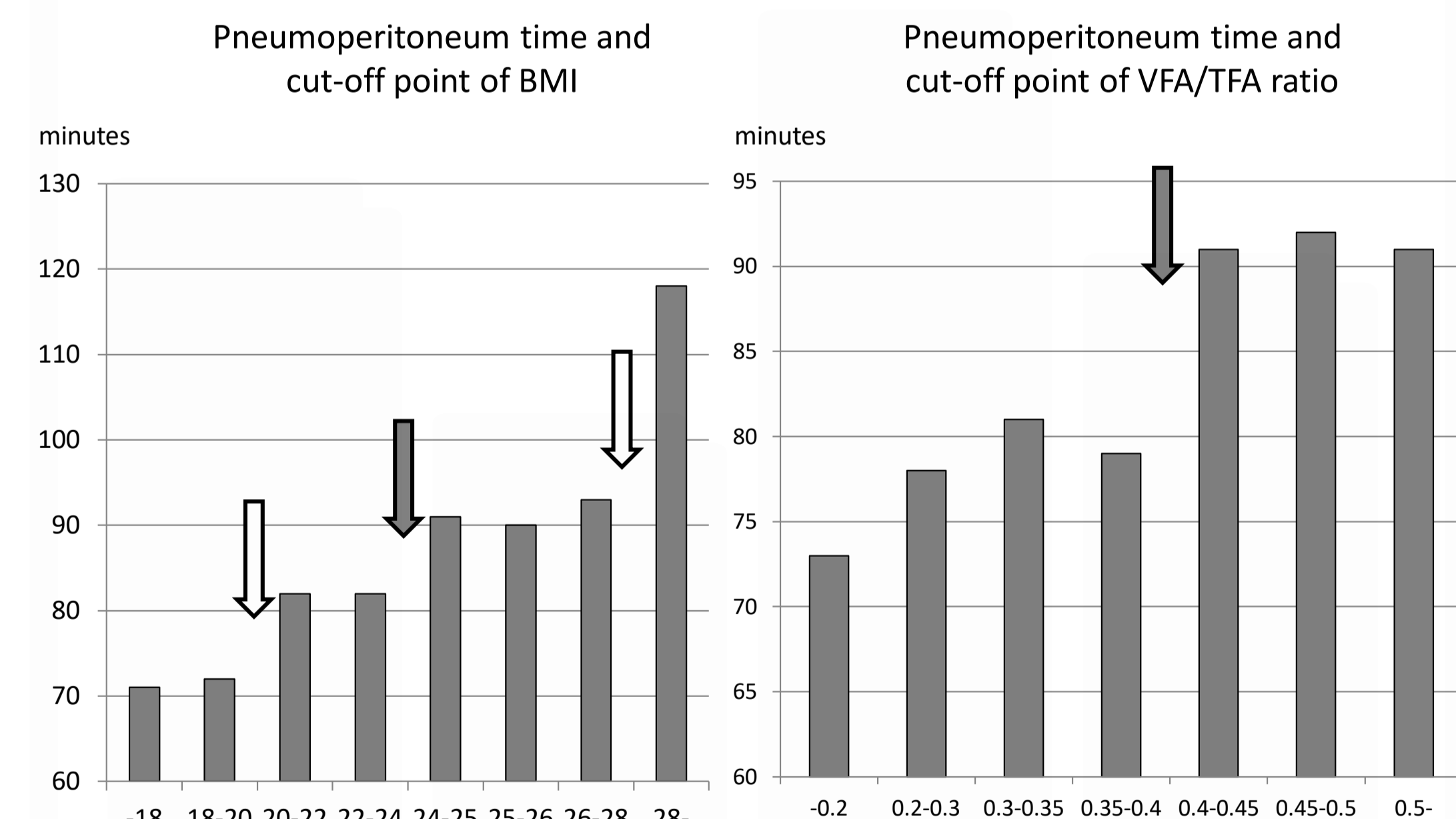
Factors	N	Pneumoperitoneum time (min)	P value	
Gender	Male	73	87	0.322
	Female	53	79	
Laterality	Right	38	88	0.392
	Left	88	87	
Tumor size	≤2cm	66	73	0.007
	>2cm	60	96	
Disease	PA	60	70	0.015
	Cushing	16	75	
	Others	21	101	
	Pheo	29	104	

Cases with larger tumor tended to require longer PT compared to the counterparts. Meanwhile, there was a significant difference on PT between the cases with pheochromocytoma and the other diseases.

Learning curve



We also found a correlation between PT and the number of operations



The left figure is a bar graph of the mean PT for each BMI range, demonstrating that the cut-off value for BMI is 24 kg/m². In 80 patients with a BMI less than 24 kg/m², PT was significantly shorter than in those whose BMI exceeded 24 kg/m² (78 vs. 94 minutes, p=0.038). Mean PT was 71 minutes in 27 patients with a BMI less than 20 kg/m², while mean PT was 118 minutes in 10 patients with a BMI exceeding 28 kg/m². The right figure shows the mean PT in each range of the VFA/TFA ratio, demonstrating a clear cut-off value of 0.4 for this ratio. PT was shorter in 65 cases with a VFA/TFA ratio less than 0.4 than in those with a ratio exceeding 0.4 (78 vs. 91 minutes, p=0.056).

Conclusions

Our results suggested that BMI is associated with the PT for single-port laparoscopic adrenalectomy, and the optimal cut-off value is 24 kg/m². Patients with a BMI less than 20 kg/m² are thought to be suitable for novice surgeons. Conversely, even experienced surgeons should carefully consider performing single-port surgery in patients whose BMI exceeds 28 kg/m². The VFA/TFA ratio was also a predictor of the technical difficulty of single-port surgery, and its optimal cut-off value was 0.4.

Suitable patients for single-port laparoscopic adrenalectomy: optimal cut-off value of body mass index

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