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Advanced ovarian cancer: Omental bursa, lesser omentum, celiac, portal and triad nodes spread as cause of inaccurate evaluation of residual tumor

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HIGHLIGHTS

► Omental bursa area is frequently involved by disease in advanced ovarian cancer.
► To achieve an optimal debulking, omental bursa and celiac nodes should be routinely evaluated.

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ABSTRACT

Objective. We evaluated the role of omental bursa (OB), surface of the pancreas, lesser omentum, caudate lobe, celiac nodes (CNs), portal nodes and triad nodes spread in advanced ovarian cancer (AOC). We investigated if the exploration and cleaning up of these areas can lead to a more complete cytoreduction and to a more realistic assessment of residual tumor in AOC.

Methods. We prospectively recruited patients diagnosed with AOC, who underwent a complete cytoreduction. Demographics, surgical procedures, morbidities, pathologic findings and correlations with OB spread were assessed.

Results. A total of 37 patients had an optimal debulking including OB evaluation and peritonectomy. The OB area procedure required in mean 65 min with an estimated blood loss of 250 ml. OB involvement was found in 67% (25/37) of cases. Peritoneal disease was found in 22 cases including 18 supragastric lesser sac and 4 porta hepatis peritoneum. CNs metastases were found in 5 cases, of which 3 cases are with bulky nodes, all presented also bulky nodes in the para-aortic area. Only in the case of a macroscopic involvement of the diaphragm OB was positive for disease. When adhesions occluding the Winslow foramen were present, no OB peritoneum involvement was found. OB resection related complications were low (2 out 25).

Conclusions. The data of this prospective study demonstrate the high rate of OB, surface of the pancreas, lesser omentum, caudate lobe, CNs, portal and triad nodes involvement and the value of investigating the dissemination and cytoreduction in these sites to obtain a real optimal debulking.

Introduction

Optimal debulking with no macroscopic visible residual disease is the most relevant prognostic factor for advanced ovarian cancer (AOC) patients and is recommend in the surgical treatment of AOC according to the last ovarian consensus conference (Gynecologic Cancer Inter-Group [GCIG] Consensus Statement on Clinical Trials in Ovarian Cancer, Vancouver) [1]. The surgical approach to AOC has changed in the last period, and radical surgery in the upper abdomen has been included in the gynecologic oncologist armamentarium to obtain optimal debulking. Several studies have stressed that the aim of debulking surgery in AOC should be to obtain no residual visible tumor. Winter et al. [2] in a retrospective study on 360 cases from 4 different GOG studies showed that patients with no residual tumor after cytoreduction have better survival than patients with residual tumor > 1 mm whilst patients with residual tumor between 0.1 to 1.0 cm and 1.1 to 5.0 cm have similar outcome. The authors conclude that "these findings suggest that radical cytoreductive procedures might be targeted for patients in whom no macroscopic residual disease is achievable".

Upper abdomen procedures may include: diaphragmatic peritonectomy, splenectomy, partial pancreatectomy, cholecystectomy, and partial hepatectomy. Literature data report that upper abdomen disease debulking significantly increases the rate of optimal cytoreduction and overall survival, with acceptable morbidities, in patients with AOC [3–5].

According to SGO survey [6], the disease sites that usually preclude optimal cytoreduction are: the diaphragm (surface disease 51.4%, bulky disease 76.3%), portal triad disease 77.1%, bulky aortic nodal disease 22.9%, bulky pelvic nodal disease 8.1%, omental disease involving spleen and/or pancreas 13.2%, bulky pelvic disease 1.8%, agglutinated

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bowel/mesentery 73.8%, disease involving the base of mesentery 82.7%. Also the presence of disease in the omental bursa (OB) area in particular at the porta hepatis and celiac lymph nodes is known to be one of the factors predicting suboptimal cytoreduction in patients with AOC [7,8]. However, recently, the involvement of some of these sites, like the OB area, are no more considered an absolute contraindication to optimal debulking.

Recent papers report that the disease in the OB area and celiac nodes (CNs) could be cytoreduced [9–11]. These papers also reported on the risk of unrecognized occult disease in the OB including porta hepatis, supragastric lesser sac (SLS), and CNs that could compromise optimal debulking. However, the percentage of OB area involvement, and the feasibility and the prognostic value of the resection of metastatic disease in the OB area including peritoneal and retroperitoneal sites are still unclear.

In an attempt to improve optimal debulking rates, we investigated the likelihood of obtaining an optimal surgical resection of disease in the OB, on the surface of pancreas, in the lesser omentum, on the caudate lobe, and at the level of CNs, portal and triad nodes; for shortness all these structures were called "OB area". We designed a prospective study to search for patterns of intraperitoneal cancer dissemination and to investigate the role of OB area cancer dissemination and the implication for optimal debulking.

Materials and methods

A prospective study was carried out to identify all patients who had evaluation and eventually resection of OB, surface of the pancreas, lesser omentum, caudate lobe, CNs, portal nodes and triad disease as part of cytoreductive surgery for AOC in the last year. Thirty-seven patients, who underwent optimal debulking, were included in the study. Exclusion criteria were: suboptimal debulking, lack of exploration of OB area because of extensive upper abdomen disease, tumors of low malignant potential and recurrent ovarian cancer disease. After Institutional Review Board approval, data were prospectively collected. All involved subjects signed an informed consent.

Preoperative work up included total body CT scan; a PET scan was performed if clinically indicated.

Indication for OB area, and/or CN metastases resection was based on intraoperative findings. Looking within the OB area posteriorly to the stomach under the small omentum, the tumor is often seen on the anterior surface of the caudate lobe, surface of pancreas and on the roof of the supragastric lesser sac. In case of deep infiltration of porta hepatis or celiac trunk the procedure was aborted. Suspect CNs were considered as those measuring more than 1 cm or suspicious on the CT or PET scan.

The procedures involving the OB at the level of the porta hepatis and CNs were performed by gynecologic oncologists with the assistance of hepatobiliary surgeons in the first cases, during the learning curve.

Anatomy and surgical technique

Xifo-pubic midline skin incision was performed. A Bookwalter Retractor™ was used for abdominal exposure. All the patients underwent: bilateral salpingo-oophorectomy and hysterectomy (if not previously done); washing; radical omentectomy; exeresis of all visible disease and pelvic and para-aortic lymphadenectomies in case of bulky nodes.

One or more of the upper abdomen debulking procedures: diaphragmatic peritonectomy, splenectomy, partial distal pancreatectomy, cholecystectomy, and partial hepatectomy, were performed when indicated. After the removal of all the omentum (with gastro-colic ligament) the lesser sac (the relevant OB) was thoroughly evaluated. Identification and extirpation of OB, surface of the pancreas, lesser omentum, caudate lobe, CNs, portal nodes and triad macroscopic disease were made during the first cytoreductive surgery attempt and confirmed by histological analysis.

According to Gray's anatomy textbook [12] the anatomy of OB area is the following:

- OB is bounded *in front*, from above downward, by the caudate lobe of the liver, the lesser omentum, the stomach, and the anterior two layers of the greater omentum. *Behind*, it is limited, from below upward, by the two posterior layers of the greater omentum, the transverse colon, and the ascending layer of the transverse mesocolon, the upper surface of the pancreas, the left suprarenal gland, and the upper end of the left kidney. To the right of the esophageal opening of the stomach it is formed by that part of the diaphragm which supports the caudate lobe of the liver. *Laterally*, the bursa extends from the epiploic foramen to the spleen, where it is limited by the phrenicolienal and gastrolienal ligaments. The OB, therefore, consists of a series of pouches or recesses to which the following terms are applied: (1) the *vestibule*, a narrow channel continued from the epiploic foramen, over the head of the pancreas to the *gastropancreatic fold*; this fold extends from the omental tuberosity of the pancreas to the right side of the fundus of the stomach, and contains the left gastric artery and coronary vein; (2) the *superior omental recess*, between the caudate lobe of the liver and the diaphragm; (3) the *lienal recess*, between the spleen and the stomach; (4) the *inferior omental recess*, which comprises the remainder of the bursa.
- The procedure to detect and eventually to resect metastatic disease within the OB area was the following: the left triangular ligament was divided allowing retraction of left lobe of liver. The stomach was pulled to identify the lesser omentum. The left gastric, common hepatic and left hepatic arteries and the vagal nerves running along the lesser curve of the stomach were evidenced and spared. The lesser omentum resection was carried out. The stomach was stretched down and the caudate lobe retracted to expose the posterior surface of the OB formed by a single layer of peritoneum. After gastro-colic omentectomy, the stomach was elevated to expose the cavity of epiploons and to open caudally the OB (Fig. 1). Tumor was mobilized from between the left liver and anterior caudate lobe (Fig. 2). This was stripped off and then detached from the caudate lobe. Tumor was then stripped from the anterior surface of the caudate lobe. When metastatic disease infiltrating superficially the peritoneum of the hepatic pedicle was found, resection of porta hepatis peritoneal disease was performed. In case of large porta-hepatis–peritoneum involvement, the Kocher maneuver was carried out. It consists in dissecting the lateral peritoneal attachments of the duodenum to

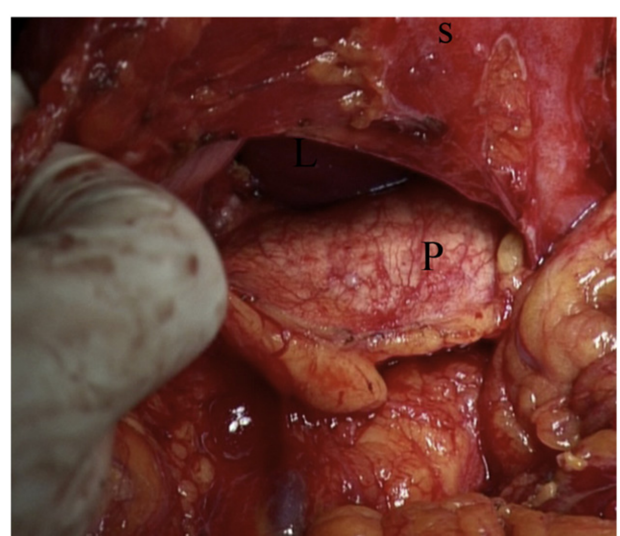

Fig. 1. The stomach (S) is pulled up to expose the cavity of epiploons and to open caudally the OB. (P: pancreas; L: liver).