

## The Appearance of Hemostatic Fleece on Different Imaging Modalities: A Case Report

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### Abstract

We report a case where hemostatic fleece (TachoSil) was misinterpreted as residual disease on imaging after macro-radical surgery for ovarian cancer. Laparotomy was performed on a 51 year-old woman due to ovarian cancer. At surgery, carcinomatosis was identified on the diaphragm with growth into the diaphragmatic muscle. Total hysterectomy, bilateral salpingo-oophorectomy, omentectomy, pelvic and para-aortic lymphadenectomy, diaphragmatic peritonectomy, appendectomy and resection of sigmoid colon were performed. During surgery an incidental small liver lesion occurred and hemostatic fleece was applied for hemostasis. Total cytoreduction was achieved. The pathology report demonstrated stage IV serous ovarian cancer (grade III). The patient was therefore referred to the Department of oncology for six series of Paclitaxel/Carboplatin. A baseline CT scan revealed an area above the liver initially described as residual disease. At the multidisciplinary conference the CT scan was revised and compared with the surgical report and it was concluded that the suspected area concurred with the hemostatic fleece applied during surgery and not a sign of residual disease. After two months of adjuvant chemotherapy, a follow up CT scan revealed almost total regression and after six months, a MRI demonstrated almost no signs of the hemostatic fleece or recurrent disease. The patient is still disease free after 18 months. Application of a hemostatic fleece may initiate inflammatory changes causing imaging artifacts. We, therefore, emphasize the importance of reporting in the operation note the specific location of hemostatic fleece applied during surgery to avoid hemostatic fleece being misinterpreted as residual disease on imaging.

**Keywords:** Ovarian cancer; Hemostatic fleece; TachoSil; Imaging

### Introduction

Ovarian cancer is the sixth most common cancer among women worldwide and the gynecological malignancy with the highest mortality [1]. The treatment of choice is a combination of cytoreductive surgery and chemotherapy.

Several studies have shown that complete resection of all macroscopic tumors at primary or secondary debulking surgery is the single most important prognostic factor in advanced epithelial ovarian cancer [2-5]. In the aim for achieving better overall survival the surgery has become more radical and with enhanced radical surgery the need for more extensive surgical techniques and devices is necessary to achieve adequate hemostasis.

Various techniques can be used to control bleeding, depending on the anatomical location and the type of bleeding. Standard techniques are ligatures, stitches or hemoclips. If the bleeding is more diffuse, techniques with thermal, chemical or mechanical procedures may be convenient.

Several different biomaterial products are available, containing different substances. Well-described hemostatic agents are collagen, gelatin and cellulose [6-10]. With diffuse hemorrhage from a surface, hemostatic fleece (TachoSil) has been demonstrated to be very efficient [11-14]. Tachosil is a development from TachoComb. It contains equine collagen, human thrombin and fibrinogen and is enzymatically degraded within 12 weeks after application [6].

Very little has been reported about the resorption process [15,16]. A single study has examined the resorption of TachoSil and healing of the underlying tissue after application in the uterus after caesarian section with excessive postpartum bleeding. TachoSil remnants were demonstrated both by ultrasound examination and hysteroscopy up to 13 months after application [17].

We report a case where hemostatic fleece (TachoSil) was mistakenly evaluated as residual disease on imaging after macro-radical surgery for ovarian cancer.

### Case Report

A 51-year old female patient was admitted with lower abdominal pain and abdominal distension for 6 weeks. Physical examination revealed a palpable hard mass in the hypogastric region. MRI revealed bilateral mass lesions in the adnexae and ascites, furthermore carcinomatosis in both upper and lower abdomen was suspected. Cancer Antigen (CA125) was elevated to 205 U/ml. At surgery, carcinomatosis was identified on the diaphragm with tumor invasion in the diaphragmatic muscle. The patient underwent laparotomy including total abdominal hysterectomy, bilateral salpingo-oophorectomy, omentectomy, pelvic and para-aortic lymphadenectomy, appendectomy, resection of the sigmoid colon (with a primary anastomosis) and resection of the peritoneum on the diaphragm. Furthermore, a small liver lesion occurred and hemostatic fleece was applied to stop the bleeding. Total cytoreductive surgery was achieved. The pathology report demonstrated: serous ovarian adenocarcinoma (grade III), stage IV, and the patient was therefore referred to adjuvant chemotherapy with six series of Paclitaxel/Carboplatin.

A baseline CT scan prior to chemotherapy revealed an area above the liver, which was initially described as residual disease (Figure 1). Revision of the CT scan in comparison with the description of the surgical procedure concluded that the area concurred with hemostatic fleece and not due to residual disease.

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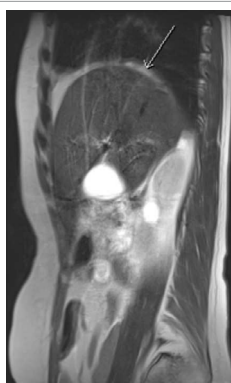
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**Figure 1:** A baseline CT scan prior to chemotherapy revealed an area above the liver, which was initially described as residual disease.



**Figure 2:** Six months later, a MRI scan exposed almost no signs of the hemostatic fleece or recurrent disease.

Two months after adjuvant chemotherapy, a CT scan revealed regression of the changes over the liver. Six months later, a MRI scan exposed almost no signs of the hemostatic fleece or recurrent disease (Figure 2).

Since completed chemotherapy the tumor marker (CA125) has been stable on 8-11 U/ml (a level above 35 U/ml is considered abnormal). The patient attend for regular follow-up/surveillance in the outpatient clinic with no evidence of disease after 18 months.

## Discussion

In recent years, ovarian cancer surgery has developed towards increasingly extensive surgery. The surgeons aim at achieving maximal debulking and a total reduction in the size of tumour in different locations in the abdominal cavity, as this is known to be the most important prognostic factor [4]. These efforts mean that the gynecological oncologist performs surgery outside the pelvic region, the usual field of expertise, and adjacent to more vascularized structures as the liver, the spleen, the pelvic and para-aortic regions. Performing surgery adjacent to these structures increase the risk of bleeding and the use of hemostatic devices has been valuable to achieve hemostasis [18-21]. The use of hemostatic fleece has been proven to be very efficient during open abdominal surgery, not only for hemostasis, but also to facilitate tissue healing. Tachosil is visible on imaging even long time after application, but is totally resorbed [15]. TachoSil is one of the few hemostatic materials registered as a medicinal product. Tachosil is an advanced development of Tacho Comb, that has been extensively studied [11]. The advantage of TachoSil in comparison to other hemostatic products is the ability to adhere to the surfaces, that's

why it is very useful to seal off sutured lesions on the diaphragm or lesions on the liver or spleen. When applied, hemostasis is achieved in 3-5 min. Resorption of the hemostatic fleece may be long and involve an inflammatory process. Still, intraabdominal adhesions have not been reported in neither experimental or clinical settings [15,16].

In this case report the hemostatic fleece was mistaken for residual disease due to imaging artifacts. This could be due to inflammatory changes in the tissue around the area where the Hemostatic fleece was applied. The adhesion quality of the Hemostatic fleece is, very effective on the diaphragm, aorta/vena cava, the liver, the bowel and in the pelvis. To avoid misinterpretation, we recommend that the surgeons carefully describe the exact location of the hemostatic fleece to avoid this mistake. No studies have investigated if the resorption of TachoSil is dependent on the site of application. Possibly, the resorption differs if the Hemostatic fleece is applied in the abdomen or in the retroperitoneum. If such a difference is present, it is very important to distinguish between relapse of disease or inflammatory changes stimulated by the resorption process in the tissue.

## Conclusion

Application of a hemostatic fleece (TachoSil) may initiate an inflammatory response and give way for imaging artifacts. Therefore we emphasize the importance of the surgeon to report the specific location for application of TachoSil in the operation note to avoid the imaging appearance to be mistaken for residual disease.

We recommend further studies to be made to describe the imaging challenges combined with the use of hemostatic fleece.

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