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Hemostasis of massive bleeding from esophageal tumor

Hemostasis for esophageal tumor

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Abstract

BACKGROUND

Esophageal cancer is a common type of cancer and serious bleeding from esophageal tumors can occur in routine clinical practice. The arrest of bleeding from esophageal tumor is not a trivial task, which can sometimes require non-standard solutions. We herein report a case of successful hemostasis of massive bleeding from esophageal tumor performed by a novel two-balloon catheter inserted endoscopically, with a local hemostatic treatment applied.

CASE SUMMARY

A 36-years old male patient with advanced stage of esophageal cancer developed bleeding from the tumor following endoscopic stenting with a self-expanding metal stent. Due to the ineffectiveness of standard approaches, after a medical Concilium, the patient was treated with a novel method based on the use of a two-balloon catheter creating an isolated area in esophagus and locally dispersing hemostatic polysaccharide powder inside the isolated interior. Hemostasis was successful and subsequent endoscopic examination revealed the presence of organized clot and localized defect, which was coagulated in a planned manner.

CONCLUSION

The method made it possible to stop massive bleeding and convert the acute complication to a planned situation with subsequent endoscopic hemostasis, re-stenting and eventually a discharge of the patient for treatment in an oncological department. The authors propose that the two-balloon catheter allowing for the isolation of a target region of gastrointestinal tract and manipulation in the interior between the balloons, combined with preserved connectivity of gastrointestinal tract can become a useful tool for urgent treatment of bleeding into the lumen of gastrointestinal tract.

Key Words: Esophageal cancer; Esophageal bleeding; Self-expanding metal stent; Endoscopic hemostasis; Hemostatic polysaccharide powder.

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Core Tip: We are describing an example of applying novel method of managing a very difficult to treat condition by using an original device/catheter we developed. Our experience of managing gastrointestinal and, in particular, esophageal bleeding suggests that treatment of such conditions is major challenge with no readily available and reliably working solutions. Success of treatment depends on multiple factors, all subject to severe limitation of time available to a physician to make decisions and apply methods. We feel that major advantage allowed for by our method is precisely its simplicity, ease of use and ability to be deployed by physicians of all levels of experience and in all types of hospital settings. For this reason, we believe that our method can help save many lives and feel compelled to share our experience with your audience.

INTRODUCTION

Various stages of dysphagia are common complication of esophageal cancer. Stenting of esophageal tumors is a standard method of treatment and palliative care. Placement of self-expandable metal stent is required, on the one hand to facilitate oral nutrition and on the other hand as the first standard step of treatment preempting neoadjuvant chemotherapy with brachytherapy [1,2]. At the same time, placement of a stent can lead to the development of various complications, the frequency of which can reach up to 50% [3]. Among them the most common are esophageal perforation, fistula, migration of a stent and bleeding [4,5]. The incidence of bleeding after stenting is not high and varies greatly from 1 to 12% [6,7]. However, the volume of bleeding if it occurs

is often massive and is associated with high mortality of patients [6-8]. Due to the fact that this complication is relatively rare, and its course is extremely aggressive, the experience of managing this group of patients is limited. The recommendations are non-systematic in nature and boil down to the fact that one should be prepared for various scenarios, from the application of various hemostatic remedies and transfusion of blood components to angiographic methods to stop the bleeding. The unfavorable outcome of this complication can be caused by a stent itself that interferes with verification of the source of bleeding, by pathological hypervascularization of a tumor, rich blood supply of esophagus, including from esophageal arteries stemming from the descending aorta, and of course, by a limited amount of time available to help a patient [6-10].

Analysis of the literature suggests that time is the main factor in the unsatisfactory result of trying to achieve hemostasis during the first wave of bleeding. The time spent on patient admission and delays in identifying the source of bleeding, trying various options of endoscopic hemostasis, switching to endovascular methods, all negatively affect the outcome of treatment. To counter this, a method has been developed that consists of isolating the source of bleeding, in this case the part of esophagus with a tumor, from other parts of gastrointestinal tract, with the possibility of delivering hemostatic agents into it while maintaining the connectivity between the parts of esophagus proximal and distal to the isolated region. The latter feature enables concurrent and continuous drainage of the proximal part and administration of solutions and enteral nutrition. This approach achieves several important effects. First, it allows one to mechanically create an isolated area with high pressure in which blood, clots, and coagulation factors facilitate hemostasis. Second, it enables localized delivery of hemostatic agents such as polysaccharide hemostatic powders. Third, by maintaining functional connectivity of gastrointestinal tract, the method allows both for the essential nutritional support and provision of fluids to a patient, and for sufficient exposure time to achieve hemostasis.

CASE PRESENTATION

Chief complaints

The patient was discharged on November 13, but already on November 14, he developed vomiting with blood, melena, weakness, an episode of loss of consciousness, and was urgently taken to the hospital. At the time of admission, the degree of blood loss, according to the changes in the level of hemoglobin, erythrocytes and hematocrit, was assessed as moderate. Blood pressure was 80/40 mmHg, heart rate was 114. Both standard intravenous hemostatic therapy and blood component transfusion were started. Endoscopic examination revealed that there was an ongoing bleeding from under the partially covered esophageal stent (Figure 2).

History of present illness

A 36-year-old male patient was admitted on an emergency basis on November 14, 2021, with manifestation of gastrointestinal bleeding. When collecting an anamnesis, it was established that for the first time the dysphagia was observed in September 2021. An X-ray investigation performed at the time revealed characteristic changes for a tumor of the gastroesophageal junction (Figure 1). The patient categorically refused further examination and treatment and was discharged. Later he was followed up at the oncology clinic, and on October 29 diagnosed with cancer of gastroesophageal junction, type II according to Siewert classification, stage IVB, Grade 2, dMMR/MSI-h-negative, HER2-negative adenocarcinoma. Concomitant diseases: obesity class III, essential hypertension. On November 10, endoscopic stenting of esophagus was performed to resolve dysphagia.

History of past illness

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Personal and family history

There are absent personal and hereditary oncological history.

Physical examination

The patient was discharged on November 13, but already on November 14, he developed vomiting with blood, melena, weakness, an episode of loss of consciousness, and was urgently taken to the hospital. At the time of admission, the degree of blood loss, according to the changes in the level of hemoglobin, erythrocytes and hematocrit, was assessed as moderate. Blood pressure was 80/40 mmHg, heart rate was 114. Both standard intravenous hemostatic therapy and blood component transfusion were started.

Laboratory examinations

Endoscopic examination revealed that there was an ongoing bleeding from under the partially covered esophageal stent (Figure 2). An attempt to perform endoscopic hemostasis by electrocoagulation of the tumor failed to achieve positive results. It was also not possible to clearly establish the localization of the source of bleeding. Blood analysis demonstrates a high volume of lost due to count of erythrocytes - 2,1 hemoglobin - 79 g/L, hematocrit - 31%.

Imaging examinations

Bleeding from gastroesophageal cancer, covered by stent was verified. Information about type of cancer and stage was received from oncological documentations, which patients has.

MULTIDISCIPLINARY EXPERT CONSULTATION

Given the severity and urgency of situation, a multidisciplinary council was held, which included surgeons, endoscopists and anesthesiologists.

FINAL DIAGNOSIS

Cancer of gastroesophageal junction, type II according to Siewert classification, stage IVB, Grade 2, dMMR/MSI-h-negative, HER2-negative adenocarcinoma. Complications: Severe form of esophageal bleeding. Concomitant diseases: obesity class III, essential hypertension

TREATMENT

It was decided that due to the impossibility of achieving hemostasis using standard methods and further deteriorating conditions of the patient, it was advisable, according to vital indications, to use the isolation method and locally introduce a polysaccharide powdered hemostatic agent. The two-balloon catheter was inserted endoscopically into the stomach past the stent, so that tumor site with a source of bleeding was located between the balloons. Balloons were inflated isolating the area of bleeding, and hemostatic powder was injected through the catheter opening located between the balloons and dispersed inside the isolated interior. As a result of performed procedure bleeding was stopped, as evidenced by normalization of hemodynamic parameters and absence of retrograde flow of blood through the control channel of the catheter. Over the next day, there was no sign of bleeding recurrence, also supported by stable levels of hemoglobin and erythrocytes count. On November 15, the day after hemostasis, the catheter was removed, and repeated endoscopic procedure was performed in order to identify the source of bleeding and to perform repositioning of esophageal stent. A 1.5-

cm long defect with an organized clot was detected in the gastroesophageal junction (Figure 3). Argon plasma coagulation was performed after which the same stent was repositioned and fixed. The fluoroscopy performed on November 18 showed that stent's position was adequate, the contrast freely entered the stomach, there were no streaks and no signs of stent migration (Figure 4). No recurrence of bleeding was observed, and patient was discharged on November 18 in adequate condition to continue treatment at the oncology clinic.

OUTCOME AND FOLLOW-UP

After 4 mo of follow-up on March 09, 2022, patient was hospitalized with recurrent dysphagia. Endoscopy of the upper part of the stent revealed tumor overgrowth and infiltration with stenosis of esophagus. Endoscopic ablation with coagulation of tumor with recanalization of esophagus was performed successfully. Two days after the procedure clinical signs of dysphagia disappeared, as confirmed by controlled esophageal fluoroscopy, and the patient was discharged.

DISCUSSION

Bleeding after stenting of esophageal cancer is a severe complication with a high rate of death. Most often it develops in the first 2 wk after manipulation [9-11]. Among the main reasons are traumatization of mucosa by the free uncovered part of a stent during active esophageal peristalsis and increased pressure on the wall of the organ at the time of its expansion by the stent, leading to the development of necrotic changes [12]. Since esophagus is well supplied with blood, the bleeding is often massive. The very presence of a stent hampers identification of the source of bleeding, prevents application of argon plasma coagulation, injection of adrenaline or clipping. Large number of collateral blood vessels and segmental type of blood supply of esophagus is the reason why many authors recommend supplementing endoscopic approaches with endovascular methods of hemostasis, which nevertheless often fail to achieve desired effect [9-13]. It is critically important to have a wide range of methods available for both

identification and tackling of the source of bleeding. In real clinical practice however, resources are often limited and implementation of extensive amount of care is associated with loss of time, which in this case is of critical importance. Presence of disseminated oncological process and poor somatic status of a patient can also play an important role, limiting surgeon's options.

The method of hemostatic treatment described here allows for localization of the source of bleeding by isolating it from other parts of gastrointestinal tract. At the same time, it does not require identification of precise location of the site of bleeding. The method implements four hemostatic approaches: 1) applying pressure on the submucosal vessels by the inflated balloons, 2) tamponade of the source of bleeding by blood clots, 3) targeted delivery of hemostatic agents to the bleeding site, and 4) prevention of migration of hemostatic agents and blood clots to other parts of gastrointestinal tract due to peristalsis. The latter prolongs exposure to hemostatic agents, which is further enhanced by the ability of the two-balloon catheter used in the procedure to preserve connectivity of gastrointestinal tract and thus be kept in place long enough to achieve desired hemostatic effect.

CONCLUSION

Availability of a fast and simple method for stopping bleeding from a tumor exposed into the lumen of esophagus, which does not require high level of specialist training, is easy to perform and provides for both long-term hemostasis and simultaneous ability to administer enteral nutrition and drain upper part of esophagus, will help save time and improve the quality of care for this group of patients. While case reported here focuses on esophageal bleeding, the method proposed is potentially generalizable and could be applied to treating bleeding in other parts of gastrointestinal tract.

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