Endovascular Management of Massive Bleeding from Laryngeal Tumor

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Abstract: Laryngeal tumors are commonly seen in Ear, Nose and Throat (ENT) department. Hemoptysis is one of the common presentations of these tumors. Carotid blowout syndrome (CBS) due to bleeding from the pseudo-aneurysm (PA) is a dreaded complication of head and neck tumors. Sometimes it can be massive and difficult to control and maybe fatal. Surgical bypass or ligation of external carotid was the only option available, but it had high mortality and morbidity associated with it. Endovascular management has given a new hope for these patients, in the form of covered stent implantation. These endovascular stents works by reconstructing the arterial wall, maintain its patency and decrease the ischemic complication rate which was higher with surgical option due to vessel deconstruction strategies. Recurrent bleeding can occur due to infection of stent which is a fearful complication but it occurs late and its reported rate in the previous studies ranges from 33-86%. We present a case of such tumor complicated with massive bleeding, which was managed by an endovascular approach. This is probably the first case where massive bleeding from the laryngeal tumor was managed with endovascular stent and embolization of blood vessels supplying the larynx.

Keywords: Laryngeal Tumor, Bleeding, Embolization

1. Introduction

Laryngeal tumors are commonly seen in Ear, Nose and Throat (ENT) department. Bleeding from these tumors is a common complication, presenting as haemoptysis. Sometimes bleeding is massive and difficult to control and may be fatal. We present a case of such tumor presenting with massive bleeding, which was managed by endovascular approach.

2. Case Presentation

A 48 years male patient was diagnosed to be a case of laryngeal tumor around one and half years back. He was taking treatment from a prestigious center, a territory care hospital. His tracheostomy had been done around six months back. He had received radiation therapy and was on chemotherapy. He had been planned for surgery. One day he presented to our ENT department with massive bleeding from nose and mouth. He was initially given medical therapy but bleeding continued despite medical therapy. Relevant blood investigations were sent and results were:

<table>
<thead>
<tr>
<th>Measurement</th>
<th>Value</th>
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<tbody>
<tr>
<td>HEMOGLOBIN</td>
<td>6.4 gm/dl</td>
</tr>
<tr>
<td>TLC</td>
<td>11,400/cumm</td>
</tr>
<tr>
<td>PLATELET COUNT</td>
<td>60,000/cumm</td>
</tr>
<tr>
<td>SERUM BILIRUBIN</td>
<td>1 mg/dl</td>
</tr>
</tbody>
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After receiving the above mentioned reports patient was transfused two units of blood and was referred to cardiology department for possible intervention to control the bleeding.

We did his carotid angiography, which showed pseudo aneurysm (PA) in right external carotid artery (ECA) and stenosis of proximal part of left internal carotid artery (Figure 1). We closed the PA by placing 4mm covered stent in right external carotid artery (Figure 2). He was started on clopidogrel and aspirin (anti-platelets).
Following the procedure, we expected that bleeding will be controlled now. But after 2 hours patient again had massive bleeding. His hemoglobin had dropped to 4gm/dl. He aspirated the blood and was put on ventilator support. He was again taken to catheterization laboratory. His carotid angiography showed no residual bleeding from the site of PA. In no option stage, we decided to embolize all the vessels that supply the larynx, which include both superior thyroid arteries (STA), which arise from proximal part of external carotid artery (ECA) and both inferior thyroid arteries (ITA), which arise from thyro-cervical trunk (a branch of subclavian artery). Right STA had already been blocked by covered stent placed in ECA. We hooked the left STA with Judkin’s right catheter and embolized it with polyvinyl chloride (PVC) particles (Figure 3). After this we hooked the ITA selectively first on left side and then on right side and embolized with PVA particles. (Figures 4-6).

Figure 1. Pseudo-aneurysm (PA) in proximal part of right external carotid artery and stenosis of internal carotid artery.

Figure 2. Closure of PA with covered stent.

Figure 3. Occlusion of left superior thyroid artery after embolization with PVC particles.

Figure 4. Angiographic visualization of left inferior thyroid artery (ITA).

Figure 5. Occlusion of left ITA by PVC particles.
After this, there was no further bleeding reported. Patient was given three units of blood transfusion and was shifted to intensive care unit. He was put on injectable antibiotics and showed improvement. He was extubated after 2 weeks and discharged after one month, with no further bleeding on follow up.

3. Discussion

Malignant tumors of larynx are not so common in the head and neck area. The most common histological variant is squamous cell carcinoma and it accounts for 85–95% of all malignant tumors of larynx [1]. It is more common in males and in people above 40 years of age. The etiology is not known but strong association has been reported with frequent exposure of laryngeal mucosa to different varieties of ingested as well as inhaled exogenous carcinogenic agents. The two most important risk factors for the development of squamous cell carcinoma of the larynx are tobacco smoking and alcohol consumption [2, 3].

Some of the common symptoms of carcinoma of larynx (COL) are: Sore throat, hoarseness of voice, dysphasia, dyspnea and weight loss. Some patients can present with hemoptysis too [4].

Bleeding is one of the common complications of recurrent and/or metastatic (R/M) head and neck squamous cell carcinoma (HNSCC). It can occur as episodes of major bleed or continuous low volume bleed or as a catastrophic event [5, 6]. Local tumor irradiation as well as chemotherapy can be the cause of bleeding, in addition to spontaneous bleed from tumor [7]. Bleeding can also result from thrombocytopenia associated with chemotherapy [8]. Free radicals can cause thrombosis, which in turn can trigger atherosclerosis, leading to weakening of wall of carotid artery causing its rupture/PA formation [9].

Treatment of COL involves multiple specialties including otolaryngologists, oncologists, and radiation oncologists. Main treatment of COL is surgical. Depending upon the stage of the cancer, it may be partial or total laryngectomy. For laryngeal cancer Trans-oral laser surgery is the treatment of choice for patients with T1 and T2 stage tumors and is an alternative for patients with T3 cancer, which shows similar results to other laryngeal function preserving therapies. Given the morbidity associated between the different treatment options available, patients have difficulties in choosing the type of treatment they will opt for [10-13].

In 1981, McNeal and colleagues, published an article, later named as Fire fighter’s study. Exploring the preferences of patients for the type of treatment they preferred. They found that 20% of patients preferred radiation over surgery as it preserved their voice and thus chose quality of life over prolonging the life [14].

Carotid blowout syndrome (CBS), is considered as a dreaded complication of head and neck cancer (HNC) due to bleeding from PA. Patients with CBS can have heterogeneous presentation and most crucial being acute life-threatening bleeding. CBS more commonly occurs in patients with HNC and those with radiation-induced necrosis, with recurrent tumors, wound complications resulting from neck dissection, or vessel erosion from pharyngo-cutaneous fistulas. Before the endovascular treatment era, the surgical bypass or ligation was the sole treatment available which was accompanied with major neurological morbidity and higher surgical mortality of 60% and 40% respectively [15]. The ischemia related complications from vessel-deconstruction strategies subsequently led to the usage of endovascular stents as a possible option. Many initial studies reported that endovascular stents can reconstruct the arterial wall and along with that can maintain vessel patency and decrease ischemic complications. Lesley et al [16] published a series of 16 CBS cases which were treated with endovascular stents, including 2 covered stents, had one case of transient ischemic attack but no mortality reported with it. [16]
Recurrent hemorrhage is considered to be a dreadful complication of CSP and may be directly related to infection of the stent. Recurrence rates of 33%–86% have been quoted in previous studies. But this type of re-bleeding occurs late.

Our patient was unique in the sense that he had PA of external carotid artery, which was successfully managed with covered stent. Still he had massive bleeding again just after few hours. Check angiography showed no residual.

Leak from covered stent. In no option stage, we embolized all four blood vessels supplying larynx and fortunately there was no further bleeding. In our opinion, this is the first case of control of bleeding laryngeal tumor by this method. Patient remained free of bleeding complication on follow up.

4. Conclusion

Laryngeal tumors are common tumors of head and neck region. CBS is its dreaded complication. Bleeding from these tumors is difficult to control. Surgical bypass or ligation of external carotid was the only treatment available, but had high morbidity and mortality. Endovascular management has given a new hope for these patients, in the form of covered stent implantation. Few cases will require embolization of feeding vessels.

References


