

## CASE REPORT

# Hemostasis in sinonasal carcinoma surgery

Aviram MIZRACHI <sup>1,2</sup> \*

<sup>1</sup>Department of Otorhinolaryngology Head and Neck Surgery, Rabin Medical Center, Petah Tikva, Israel; <sup>2</sup>Center for Translational Research in Head and Neck Cancer, Davidoff Cancer Center, Petah Tikva, Israel

\*Corresponding author: Aviram Mizrachi, Davidoff Cancer Center, 39 Jabotinski St., Petah Tikva 49100, Israel. E-mail: [aviramguy@hotmail.com](mailto:aviramguy@hotmail.com)

### ABSTRACT

A case of a nasal cavity squamous cell carcinoma presented with concurrent neck metastasis in an elderly woman with a history of esophageal cancer. Electrocauterization was unable to control the exposed maxillary bone hemorrhage during the maxillectomy surgery. WoundClot hemostatic gauze, when applied to the exposed bleeding bone, achieved rapid and complete hemostasis.

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The most common form of sinonasal carcinoma is poorly differentiated squamous cell carcinoma of the maxillary sinus,<sup>1,2</sup> accounting for almost 50% of cases.<sup>3</sup> Some 5% of cases are malignant lymphomas.<sup>4</sup>

Men in their 60s or 70s are mainly affected.<sup>5</sup> Common symptoms include pain, oral and facial swelling, nasal obstruction and epistaxis. Diagnosis can be delayed due to these symptoms also being manifestations of more common conditions such as chronic rhinitis or rhinosinusitis.<sup>5</sup>

The tumor grows and fills the sinus as it continues to mimic sinusitis, until the surrounding bone has been perforated and adjacent structures invaded. Metastases from both the nasal cavity and paranasal sinuses may occur. Most patients are diagnosed, therefore, with the disease in an advanced stage,<sup>6</sup> therefore cure rates are typically poor (<50%). Maxillary sinus malignancies have a poor prognosis.<sup>6,7</sup>

It is thought that these cancers may be related to certain industrial or toxin exposures, including wood dust, nickel and chemical solvents like formaldehyde.<sup>8-10</sup> A majority of patients are smokers,<sup>4</sup> with many working in mining, smelting, woodworking or painting.<sup>9,10</sup>

For the most part, accepted therapy tends toward a combination of radiation, chemotherapy and surgery, in a va-

riety of combinations and sequences.<sup>5</sup> The surgery and its planning are often difficult, due to the proximity of many important nerves and blood vessels, as well as the brain, eyes, mouth and carotid arteries.

Cancers of the nasal cavity typically undergo wide local excision, wherein an edge of normal tissue is removed along with the tumor. Depending on the tumor's location, this may necessitate the removal of the entire septum or a portion of it. If the cancer is affecting the skin or deep tissues of the nose, part or all of the nose may require removal; the nose can then be rebuilt with tissue from other areas, or a prosthesis may be fitted.<sup>4,11</sup>

The goal of the surgery is to remove the entire tumor while maintaining appearance and function (ie. breathing, speech, chewing and swallowing) as normal as possible. Rebuilding and repairing the surgical site is an important aspect of the overall approach.<sup>4,12</sup>

### Case report

A 76-year-old female presented with a carcinoma of the nasal cavity. Comorbidities included esophageal cancer previously treated with chemoradiation, hypertension and

diabetes. An open maxillectomy and a neck dissection were performed.

Following the maxillary bone osteotomy, the exposed bone raw surface exhibited moderate bleeding, which did not respond to electrocauterization. Furthermore, the carcinoma had metastasized to cervical lymph nodes and surgery for the metastasis could not be initiated until the sinus hemorrhage was under control.

A nurse suggested trying WCH gauze. Two patches of 5X5 cm WoundClot were used to cover the exposed bone. The WoundClot gauze was placed on the bleeding source in the maxillary sinus. It began to absorb blood and transform into its gel state. WCH self-adhered to the bleeding vessels, without the need to apply pressure onto the site. The WoundClot provided very good and rapid hemostasis, forming a complete, stable, strongly adhering gel, requiring no manual pressure. The WoundClot was left *in situ*; no re-bleeding occurred. Two units of blood were transfused. The second phase of the surgery could now begin.

### Discussion

Paranasal sinus tumor surgery depends on the tumor type, location, size and whether it has grown into other areas of the head or neck. The operations can range from ethmoidectomies, with relatively minor bone removal, to maxillectomies, with removal of osseous tissue around the maxillary sinus, including bone from the hard palate, some upper teeth, part or all of the orbit, the zygomatic arch and/or bony part of the upper nose. With more advanced cancer, which has spread, a craniofacial resection may be indicated. This operation is similar to a maxillectomy, but additionally removes upper parts of the orbit and the front base of the skull.<sup>13</sup>

Some cases can be treated *via* endoscopic surgery, which reduces tissue damage and decreases recovery time. For some cancers, long-term outcomes with the endoscopic approach can be as good as, or even better than, with conventional surgery. Endoscopic surgery is typically considered for small tumors, or to control larger tumors in patients who are not candidates for a larger operation. Then radiation therapy will be added to the treatment protocol. Endoscopic surgery for sinonasal tumors is becoming more common with the training of more surgeons in its techniques and applications.<sup>14</sup>

While surgery continues to be the major treatment modality for the majority of these cancers, radiation therapy is used in unresectable cases and poor surgical candidates. Advanced tumor, recurrent tumor, or cervical lymph node

metastasis require combinations of surgery and radiotherapy with or without the addition of chemotherapy.<sup>15</sup> With advances in radiation therapy, higher doses can be administered to the nasal cavity and paranasal sinuses, while sparing critical structures like the eye and optic chiasm.<sup>16, 17</sup> Radiation therapy must be carried to high doses for any significant probability of residual microscopic disease following surgery.

Surgery carries some degree of risk, including blood clots, infection, pneumonia and possible complications from anesthesia. Certainly, more complex surgery on the more compromised cancer patient will result in higher risks. Larger or hard to reach cancers can require complicated surgery with side effects that include infection (skin, meningitis or intracranial abscess), bleeding, scarring, speech and swallowing issues, and visual changes. The surgery may also be disfiguring if facial bones and soft tissue of the nose or face need to be removed. Sometimes the orbit and its content may require removal. Reconstructive surgery, tissue grafts or prosthetics can be part of the overall plan for a particular patient.<sup>18</sup>

Approximately 90% of oncology patients demonstrate coagulation abnormalities.<sup>19</sup> Chemotherapy, radiation, and bone marrow transplant can affect both platelets and different coagulation factors. This may result in thrombocytopenia and coagulopathy, leading to bleeding during cancer treatment. During surgery, bleeding from the nasal mucosa with diffuse oozing can occur, as well as traumatic hemorrhage of the sphenopalatine artery.

Electrocoagulation is utilized during mucosal incision, along with nasal irrigation and compound vasoconstriction nasal drops. Electrocoagulation works when the bleeding vessel is isolated and treated; a raw surface of bleeding bone does not lend itself to this type of hemostasis.

WoundClot Hemostatic (WCH) gauze is a novel hemostat for the operating room environment. WoundClot is uniquely effective without compression, becoming a stable gel upon contact with blood; this gel facilitates a strong adherence to the bleeding tissue even under high pressure, high volume bleeding sites. The stronger the bleeding pressures in the wound, the stronger the attraction. Furthermore, the efficacy of WoundClot is not dependent on specific isolation of the vessels that are injured.

A key to WoundClot's effectiveness is its non-oxidative production method. Other hemostatic products on the market utilize an oxidative process, which accelerates their decomposition, therefore limiting the crucial initial duration of product capacity and activity.

WoundClot's absorption capability, over 2500% its own weight, is a result of this capacity to form a bioabsorbable gel when exposed to a large volume of blood; by absorbing the blood it captures clotting factors and enhance the natural coagulation process by many folds.

The entire clotting cascade activity is enhanced and optimized to result in a stable biological clot and achieve natural hemostasis based on the blood's inherent coagulation capabilities.

WoundClot's versatility accommodates a variety of relevant clinical considerations, including oncology, orthopedics, cardiovascular, endoscopic, obstetric/gynecologic, bariatric/gastrointestinal surgery, trauma resulting in many types of bleeding, as well as a valuable adjunct for dialysis patients.

### Conclusions

Bleeding from exposed bone is challenging to control. WoundClot is very effective, and easy to use. We often use Surgicel Fibrillar, however, WoundClot provides better raw surface coverage when the bleeding occurs from bone. In addition to maxillectomies, we also use WoundClot for thyroidectomies, neck dissections and laryngectomies.

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