

# An Unusual Clustered Series of Foreign Body Reactions to Oxidized Regenerated Cellulose in Head and Neck surgery

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*An Unusual Clustered Series of Foreign Body Reactions to Oxidised Regenerated Cellulose in Head and Neck surgery*

- A Case series of four post-operative patients

## Key Points

- Oxidised Regenerated Cellulose (ORC) is a widely used topical haemostatic agent with just three case reports of complications in head and neck patients.
- We report a case series over a three-month period including four patients whom all had serious complications related to ORC use.
- This series includes the only case-report of a patient who necessitated emergent return to theatre secondary to life-threatening airway compromise.
- Topical absorbable haemostats and other foreign body materials used in surgery should always be considered in the differential diagnosis of post-op complications.

## Introduction

Oxidised regenerated cellulose is a popular absorbable haemostatic agent in use for decades. It is a bio-absorbable oxidised cellulose polymer made of polyhydroxyglucuronic acid. In addition to its haemostatic properties, it has been known to prevent adhesions and has a wide range of bactericidal properties particularly against *Streptococcus Pneumoniae*, *Methicillin Resistant Staphylococcus Aureus* and *Pseudomonas Aeruginosa*.<sup>11</sup> Schonauer C, Tessitore E, Barbagallo G, Albanese V, Moraci A. The use of local agents: bone wax, gelatin, collagen, oxidised cellulose. *Eur Spine J* . 2004;13 Suppl 1(Suppl 1):S89-96.

It is routinely used in Head and Neck surgery for the reasons described above. However, it has been known to mimic tumor recurrence and abscess formation on imaging. 22Melamed JW, Paulson EK, Kliever MA. Sonographic appearance of oxidised cellulose (Surgicel): pitfall in the diagnosis of postoperative abscess. *J Ultrasound Med*. 1995 Jan;14(1):27-30. PMID: 7707473. Only sporadic case reports exist where it has clinically presented as a hypersensitivity/foreign body reaction. No case report exists where airway compromise requiring emergency intervention was warranted.

Herein we report a series of four patients all presenting within one month of each other in the early post-op period with significant complications.

## Case series

The following is an account of a 47 year old female, day 2 post right submandibular gland excision (SMG) for suspected pleomorphic adenoma, who was referred to the on call team with increased neck swelling and difficulty breathing. On review, the patient had developed difficulty in breathing in addition to dysphagia

and dysphonia. There was a firm swelling measuring 8x10cm in the right submandibular region. Fibreoptic nasendoscopy (FNE) revealed an oedematous aryepiglottic fold and supraglottis, causing deviation of the epiglottis with subsequent airway compromise. Needle aspiration and opening of sutures provided minimal relief and she was taken emergently to theatre. On exploration, minimal clotting or frank bleeding was visualised. However, tissues around the ORC (placed at the time of initial surgery) appeared edematous and inflamed. The ORC was removed and minor bleeding points cauterised using diathermy. Given the oedema initially visualised at FNE, the patient remained intubated via a nasal tube for two days. She was discharged on day 5 post removal of ORC.

Our second experience with ORC related morbidity was of a 56-year-old male, day 4 post thyroglossal cyst excision, who presented to the emergency department (ED) with pain and swelling around the surgical site. On examination in the ED, the post-operative wound was swollen, erythematous and tender, with discharging pus visible, appearance on presentation can be seen in Figure 1. Needle aspiration to release the collection yielded only 10 ml of aspirate, with minimal reduction in the size of the collection. A CT Neck outlined a large infected haematoma extending almost through level VI of the neck, measuring maximally 8.6cmx7cm as seen in Figure 2. The following day he was taken to theatre for an exploration of the neck wound where copious amounts of infected looking ORC were removed with little bleeding identified. The wound was washed out and haemostasis achieved with bipolar diathermy. Culture of the ORC revealed staphylococcus aureus. Recovery immediately post-operatively was uncomplicated. However two further aspirations have been required of the wound for post-operative seroma formation.

Our third case within this four-week period is that of a 56-year-old female presenting with a neck swelling and fevers on day 4 post right parotidectomy for a pleomorphic adenoma. She had undergone an uncomplicated right parotidectomy and she was discharged 2 days later. On review in ED the wound was clean, although a firm non-fluctuant swelling was palpable. Labs on admission were normal. On aspiration, 3mls of haemoserous fluid was collected. She was commenced on antibiotics and a CT neck reported an infected haematoma as seen in Figure 3. An US neck was then performed the next day which noted that although “pus” had been aspirated, the CT and sonographic features were not consistent with an abscess and the collection was likely to be a liquefying haematoma or a sialocele. Diagnostic intrigue remained around the case that was not resolving clinically. Both aspirates sent to microbiology remained sterile on culture. A further drainage attempt was undertaken 2 days later with no further aspirate obtained. At this point, it was thought that the swelling was likely inflammatory, so the patient was started on Dexamethasone. She was discharged two days later. Throughout admission, inflammatory markers were normal. Blood cultures taken during a febrile episode were also sterile.

The fourth and final case describes a 56-year-old female who presented to A&E with a secondary post-tonsillectomy bleed on the fifth post-operative day. She was taken to theatre from A&E after conservative measures to stop the bleeding were unsuccessful. A large clot was found in the left tonsillar fossa with an actively bleeding vessel in the upper pole. A small piece of ORC was placed in the tonsillar fossa and the pillars closed. The following morning, she complained of a foreign body sensation in her throat, with associated nausea and vomiting. On examination, a large clot in the mid-pole of the left tonsillar fossa was visible. She was restarted on hydrogen peroxide gargles with regular anti-emetics. However, the foreign body sensation worsened throughout the morning with worsening retching and agitation. On reviewing the oral cavity, a large foreign body was partially obstructing her oropharynx. This was removed using a Magill’s forceps, resulting in immediate relief. Further examination revealed that both tonsillar fossae were now clear, with no clots visible. Thus, the foreign body was in fact the ORC, which had unexpectedly expanded significantly, bursting the sutures holding the tonsillar pillars together leading to partial airway obstruction. On removal, the ORC measured 7.0x1.5cm as seen in Figure 4. She remained under observation for another 24 hours, and then discharged with oral antibiotics.

### *Discussion*

Intraoperative bleeding prolongs procedures and if left untended can result in significant morbidity and even mortality. A wide variety of haemostatic agents exist to overcome this physiological obstacle to surgical

intervention. Oxidised Cellulose, first used in 1945, has been adopted by surgeons worldwide and is now used in a wide variety of surgical specialties. 11Frantz VK, Lattes R. Oxidised cellulose-absorbable gauze (cellulosic acid). JAMA. 1945;129:798–801.

ORC provides a platform for platelet aggregation and hemostasis. Its low pH promotes clot formation and contributes to its antibacterial properties. Unfortunately, it can also irritate tissues causing inflammation.22Achneck HE, Sileshi B, Jamiolkowski RM, et al. A comprehensive review of topical haemostathemostatic agents: efficacy and recommendations for use. Ann Surg. 2010;251:217–228. Degradation of the product commences within 1-2 days; inflammatory granulation tissue is seen at day 7, and complete degradation occurs between 4 and 8 weeks. 33 Frantz VK. Absorbable cotton, paper and gauze: (oxidised cellulose) Ann Surg. 1943;118:116–126.

Despite its use, ORC is a foreign body and has rarely caused serious complications. Case reports in thoracic surgery have described migration of ORC resulting in profound morbidity to the patient and even paraplegia44Brodbeck AR, Miles JB, Foy PM, Broome JC. Intraspinally oxidised cellulose (Surgicel) causing delayed paraplegia after thoracotomy—a report of three cases. Ann R Coll Surg Engl. 2002 Mar; 84(2):97-9.. In gynecology and urology, ORC granulomas have been seen to mimic tumor recurrence. 55 Radiologically, ORC has caused diagnostic dilemmas in post-op patients especially when mimicking abscess formation <sup>2</sup> In two of our cases radiological imaging was not conclusive in reaching a diagnosis.

Only three previous case-reports exist detailing complications in head and neck surgery. One case in 2012 in Dublin, where a patient presented 30 days post-thyroidectomy with wound breakdown secondary to a delayed hypersensitivity reaction to ORC.66<sup>8</sup> Royds J, Kieran S, Timon C. Oxidised cellulose (Surgicel) based reaction post thyroidectomy mimicking an abscess: A case report. Int J Surg Case Rep. 2012;3(7):338-9. doi: 10.1016/j.ijscr.2012.03.034. PMID: 22572542. The second in London, where delayed hypersensitivity was suspected after a patient developed oedema and erythema over 24 to 48 hours post thyroidectomy. 77Rubecka S, Mihaimeed F, A Rare Case of Oxidised Cellulose Causing an Reaction Mimicking Post Thyroidectomy Abscess Formation - A Case Report & Review of Literature. International Journal of Surgery and Research (IJSR) ISSN: 2379-156X Symptoms resolved on removal of the ORC in both cases. The third case occurred in Stevenage in 2013 where ORC was used in the management of a post tonsillectomy bleed by placing it within sutured tonsillar pillars. This patient also presented with partial airway obstruction due to expansion and dislodgement of the haemostatic material. 88<sup>10</sup>Jacques T, Nash R, Kenway B, Vlastarakos P; Pitfalls of operative management of secondary post-tonsillectomy haemorrhage – a case report; B-ENT. 2013; 9(4):335-7

On discussing our particular case series with the consultants and theatre staff involved, it was noted the ORC brands used in theatres had recently been changed. The new brand is an absorbable haemostat not previously used within the department, Curacel®. We are aware that different ORCs have different manufacturing properties, with some brands taking longer to disintegrate. Little data exists comparing brands, although on review of the literature no single brand had a higher complication rate. Regardless, according to the manufacturing details of the new brand, a significant increase in size or inflammatory response was not expected.

### *Conclusion*

ORC is accepted as safe and convenient to use in all Head and Neck surgery.

This case series highlights the need for complications of absorbable haemostat usage to be considered in the differential diagnosis of head and neck patients presenting with an atypical neck swelling in the acute post-operative period. Serious consideration should also be made on whether ORC should be used within the oral cavity due to the risk of airway obstruction if significant expansion occurs.

### *Conflict of interest*

All authors have no conflict of interest

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*Ethical approval*

Consent was sought from all four patients involved.

*References*



**Figure 1 Case 2 Post Thyroglossal cyst excision**



Figure 2. Case 2 CT Neck post re-admission



Figure 3. Case 3 CT neck on re-admission



Figure 4. ORC post removal from oral cavity