A review on intra-operative and post-operative bleeding during implant placement in completely edentulous patients

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INTRODUCTION

Dental implants have come a long way since their first report by Dr. P. Branemark in the year 1978. Several research groups the world over are focused on improving the design of the dental implants to improve the predictability of the clinical outcome. Nevertheless, today, implant-supported restorations have vastly improved the lifestyle of completely edentulous patients even in cases with resorbed ridges.¹ From the materials science perspective, a lot of ground has been done and also in progress to improve the dental implants. However, unlike in partially edentulous patients, implant placement and restoration in completely edentulous patients is a challenge partly due to the advanced age of these edentulous patients.

Many of these patients would have systemic conditions such as diabetes and hypertension which needs to be factored while planning implant-supported prosthesis.² One major difficulty faced during and immediately after implant stage I surgery in completely edentulous patients is the severity in bleeding. Intra-operative and post-operative bleeding during implant surgery is a serious situation which can have serious ramifications if not managed properly. There are several factors that need to be considered in managing a geriatric patient with severe intra-oral bleeding.

There are several ways of controlling excessive bleeding. These include pressure pack application, use of astringents, styptics, hemostats, aluminum chloride, cauterization, and artery ligation.³ Aside from this, the management of blood loss includes blood transfusion, saline infusion, and emergency tracheostomy in case of edema in the floor of the mouth that causes airway obstruction.⁴

There are no many studies on the bleeding complications associated with implant surgery in completely edentulous patients. This systematic review was performed to assess the severity of intra-operative and post-operative bleeding encountered by

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dentists while performing and also when encountered immediately after stage I surgery and its management.

**MATERIALS AND METHODS**

A Medline (PubMed) search was made of papers published on intra-operative and post-operative bleeding associated with implant surgery in completely edentulous patients up to April 2019. The obtained articles were then subjected to scrutiny to satisfy the inclusion and exclusion criteria after which the selected articles were analyzed for their level of evidence.

**Inclusion Criteria**
1. Articles published in English
2. Studies performed on humans
3. Availability of full-length articles
4. Specification of time from implant placement to bleeding
5. Specification of the treatment used to solve the problem.

**Exclusion Criteria**
1. Studies involving patients having anticoagulants
2. Studies involving dentate patients.

**PICO**

- **P**: Edentulous patients opting for implant-supported prosthesis
- **I**: Implant placement, Flap elevation
- **C**: Styptics, Hemostats, placebo, aluminum chloride, cauterization, artery ligation
- **O**: Intra-operative bleeding, post-operative bleeding, airway obstruction, hematoma

**RESULTS**

The search terms used in the study is given in Table 1. The systematic search yielded five articles. However, three of the articles were Cochrane study and were excluded from the study as they focused on infections following implant surgery. Only one article pertained to blood loss and its management in completely edentulous patient and was included in the study. The details of the articles obtained from the search, as well as the reasons for their exclusion is listed in Table 2. Table 3 shows the details of the only article included in this study.

**DISCUSSION**

The results of the present study showed that there is a scarcity in the number of articles published on the problem of uncontrolled or excessive bleeding encountered in geriatric completely edentulous patients during implant surgery. From the available literature, the causes of bleeding during flap elevation could be due to either a failure to stabilize the flap, tearing of soft tissues caused by tight or sharp suture material, masticatory trauma and traumas resulting from early temporization or an inappropriately modified temporary prosthesis.\[5\] In such cases, the

### Table 1: Search terms and the results obtained from PubMed search

<table>
<thead>
<tr>
<th>Search</th>
<th>Query</th>
<th>Items found</th>
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<tbody>
<tr>
<td>#6</td>
<td>Search (((((((((edentulous) OR completely edentulous) OR mandibular edentulous) OR maxillary edentulous)) AND (((((Implant surgery) OR Implant placement) OR multiple implants)) OR flap elevation) OR flap surgery) OR soft tissue elevation)) AND ((((((((((Placebo) OR styptics) OR haemostats) OR hemostats) OR haemostasis) OR hemostasis) OR haemostatic agent) OR hemostatic agent) OR aluminium chloride) OR cauterization)) OR pressure packing) OR artery ligation) OR blood transfusion) AND (((((((((local accidents) OR intraoperative bleeding) OR intra-operative bleeding) OR postoperative bleeding) OR post-operative bleeding)) OR airway obstruction) OR haematoma) OR hematoma) OR postoperative complications)) AND (((((case reports) OR clinical trials) OR randomized clinical trials) OR randomized control trials) OR randomized clinical trial) OR randomized control trial)</td>
<td>5</td>
</tr>
<tr>
<td>#5</td>
<td>Search ((((((Implant surgery) OR Implant placement) OR multiple implants)) OR flap elevation) OR flap surgery) OR soft tissue elevation)</td>
<td>3299422</td>
</tr>
<tr>
<td>#4</td>
<td>Search (((((((((local accidents) OR intraoperative bleeding) OR intra-operative bleeding) OR postoperative bleeding) OR post-operative bleeding)) OR airway obstruction) OR haematoma) OR hematoma) OR postoperative complications</td>
<td>731171</td>
</tr>
<tr>
<td>#3</td>
<td>Search (((((((((Placebo) OR styptics) OR haemostats) OR hemostats) OR haemostasis) OR hemostatic agent) OR hemostatic agent) OR aluminium chloride) OR cauterization)) OR pressure packing) OR artery ligation) OR blood transfusion</td>
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</tr>
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</tr>
<tr>
<td>#1</td>
<td>Search (((edentulous) OR completely edentulous) OR mandibular edentulous) OR maxillary edentulous</td>
<td>16625</td>
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Hemorrhage resulting from perforation of the lingual, mandibular region, and is usually controlled through surgical ligation of both the lingual and facial arteries. 

Hemorrhage in the posterior, lingual, mandibular region due to damage of the mylohyoid artery may be controlled by strong finger pressure at the point of bleeding or in the medial mandibular area just distal to the roots of the third molar. Arterial hemorrhage occurring in the median, lingual, mandibular region, due to damaged submental artery can be controlled through surgical ligation of both the lingual and facial arteries. Damage to sublingual and submental arteries would lead to bleeding in the anterior, lingual, mandibular region, and is usually controlled by compression, infiltration of a vasoconstrictor, or ligation.

Hemorrhage in the mandible occurs most frequently in the interforaminal region. Perforation of the mandibular lingual cortical plate and damage to the either of the following arteries, inferior alveolar artery and its branch the mylohyoid artery, the facial artery and its branch the submental artery, and the lingual artery and its branch the sublingual artery or any of their branches during osteotomy may even compromise the life of the patient. The high risk of damaging the arteries of the floor of the mouth is explained by the proximity of the vessels to the lingual cortical and the sublingual fossa. Damage to the mandibular lingual cortical plate is the most frequently described in association with hemorrhagic accidents during dental implant placement.

CONCLUSIONS

This systematic review briefs the common bleeding episodes encountered during implant surgery in completely edentulous geriatric patients. It is evident there is sparse literature on the incidences of bleeding episodes encountered in completely edentulous patients and their management. Bleeding is a serious complication that needs to be addressed by a competent surgeon, and it should be borne in mind that prevention is better than cure. Hence, knowledge of the anatomy of the area of surgery as well as pre-surgical planning using cone beam computed tomography is strongly advised.

REFERENCES


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