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Management of Haemorrhage in oral surgery

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Abstract

Haemorrhage can manifest in many different ways depending on the mechanism and anatomic location. Management of haemorrhage is oral surgery is one phase that the surgeons need to put more focus on along with performing the surgery. It is a common and serious medical emergency that requires early detection and appropriate intervention. This article reviews the various method of management of haemorrhage in exodontia, and highlights the role of the interprofessional team in improving care for patients with this condition.

Keyword: Haemorrhage, nebulous, practitioner

Introduction

Haemorrhage is an acute loss of blood from a damaged blood vessel. It can be minor, similar as when the superficial vessels in the skin are damaged, leading to

petechiae and ecchymosis. It can also be significant, leading to a more nebulous constellation of symptoms. The immediate phenomena attendant [1] on the loss of blood are a diminution in the fullness and force of the pulse, paleness of the surface, and reduction of the temperature of the body.

External bleeding occurs from a body perforation or a traumatic crack. Internal bleeding requires a high position of clinical dubitation attained through a thorough history and physical, laboratory tests, imaging, and close monitoring of vital signs.

Haemorrhage [2] remains one of the leading causes of trauma- related deaths. Haemorrhage can be either external or internal. External bleeding occurs from a body perforation or a traumatic crack. Internal bleeding requires a high position of clinical dubitation attained through a thorough history and physical, laboratory tests, imaging, and close monitoring of vital signs. Preoperatively assessing a patient's risk of perioperative bleeding will allow the surgeon to be more prepared when an incident occurs. The use of good surgical technique, proper anaesthetic support, mechanical haemostasis techniques, and topical haemostatic agents will allow the practitioner to work more efficiently.

Epidemiology and Incidence

Trauma is the third most common cause of mortality [3] worldwide and is the leading cause of death in the age group ranging between 1 and 44 times. Among those trauma cases, major haemorrhage is responsible for 30 to 40 percentage of mortality, with over to half of them dying previous to their appearance to sanatorium. Major haemorrhage is defined as the loss of 100 of total blood volume within 24 hours, loss of 50 within four hours, or the loss of 150 mL per nanosecond.

Globally, road traffic injuries result in 1.2 million deaths per year [4], with an additional 20–50 million injuries. They rank as the 11th leading cause of death overall, accounting for 2.1% of all deaths worldwide and 25% of injury-related deaths. Violence is a large contributor to injury-related fatality as well, with 1.6 million deaths worldwide in 2000, representing 16% of mortality from injury [5]. It is by far the leading cause of death among those aged 15–44 years and is much more prevalent in low- to middle-income countries. Worldwide [4], an estimated 5 million people died as a result of injury in the year 2000, with a mortality rate of 83 per 100,000 of the population. More than 90% of injury-related fatalities occur in low- and middle-income nations.

Causes of Haemorrhage

Every individual in the world is at risk for traumatic injury. The etiologist of injury is as diverse as the lifestyles and socioeconomic backgrounds of its victims, ranging from interpersonal violence and terrorism to motor vehicle crashes and occupational accidents.

Local cause of Haemorrhage includes traumatic injury of blood vessels by accident, surgery, Destruction of vascular wall, as on the case of tuberculosis, malignant tumours and peptic ulcers. Other sources of haemorrhage include organ damage (hepatic, splenic, renal, adrenal), vascular injury, gynaecologic/obstetric procedure complications, or coagulopathies.

General cause includes hypertension and general venous congestion, blood disease as haemophilia, Vit C or Vit k deficiency. There is various medical condition are there that can lead to haemorrhage as well.

Some medications [6] as well as certain treatment can further add to chance of bleeding. Self-inflicted violence represents 16% of injury-related mortality worldwide, with falls and burns accounting for 6% and 5%, respectively. All the above condition if untreated can further lead to shock.

Effects of haemorrhage

Systemic effects due to haemorrhage is elevated blood pressure leads to a weakening of the arterial walls. Symptoms vary ranging from unilateral weakness to headache, nausea, vomiting, and altered mental status. A rapid rate of blood loss places increased stress on the cardiovascular system to maintain haemodynamic homeostasis. If serious blood loss is left untreated it may cause chest pain, confusion, and increase in heart rate, organ failure, seizures, shock, coma and death [7].

Consequence of Haemorrhage

Shock refers to the inadequate perfusion of tissues due to the imbalance between the oxygen demand of tissues and the body's ability to supply it. Classically, there are four categories of shock. They are of following types: a) Hypovolemic b) Cardiogenic c) obstructive d) distributive shock. Hypovolemic shock occurs when there is decreased intravascular volume to the point of cardiovascular compromise. The hypovolemic shock could be due to severe dehydration through a variety of mechanisms or from blood loss. Cardiogenic shock is a life-threatening condition in which your heart suddenly can't pump enough blood to meet your body's needs. Cardiogenic shock is rare. It's often deadly if not treated immediately. When treated immediately, about half the people who develop the condition survive. Obstructive shock is one of the four types of shock, caused by a physical obstruction in the flow of blood. Obstruction can occur at the level of the great vessels or the heart itself. Causes include pulmonary embolism, cardiac tamponade, and tension pneumothorax. These are all life-threatening. Distributive shock is a medical condition in which abnormal distribution of blood flow in the smallest blood vessels results in inadequate supply of blood to the body's tissues and organs. It is one of four categories of shock, a condition where there is not enough oxygen-carrying blood to meet the metabolic needs of the cells which make up the body's tissues and organs. Distributive shock is different from the other three categories of shock in that it occurs even though the output of the heart is at or above a normal level. The most common cause is sepsis leading to a type of distributive shock called septic shock, a condition that can be fatal.

Basic management of haemorrhage in hospital setting

The management of haemorrhage will vary based on anatomic location, the extent of the injury, patient presentation, and the resources available. Resuscitation with IV fluids is necessary if the patient is demonstrating signs of hypovolemia. Blood product administration should be in equivalent amounts (1:1:1 PRBCs, FFP, platelets) and transfused as needed. Patients receiving transfusions should have monitoring for hypothermia. The goals of treatment are to restore intravascular volume and to maintain oxygen delivery until the source of bleeding can be resolved.

Pre-hospital management

It includes stopping compressible haemorrhage and rapid evacuation to a trauma hospital where definitive treatment can occur. In a resource limited environment, providers should follow ATLS recommendations of sequential airway, breathing, and circulation management (ABC); however, the military and other pre-hospital organizations have adopted a, CABC approach.

In-hospital management

In-hospital management should be a seamless continuation of prehospital management. The, CABCparadigm [7] should be followed with concurrent activity by well-rehearsed teams. Tourniquets and compression bandages should be checked. Evidence of shock or incompressible haemorrhage should trigger an

immediate response of surgery or interventional radiology with or without a CT scan on the way to the operating theatre. Fluid responders should still be treated with immediate/urgent surgery and rapid transfer considered without the need for full invasive monitoring or a completed secondary survey. Administration of blood products should be guided by POC haematological results where possible. Once in theatre, the Snap Brief is conducted to communicate the surgical plan, blood products administered including rate, and any coagulopathy present. At 10 min intervals, updates are communicated as to time duration, blood products given, rate of infusion, clotting status and temperature with ROTEM, and blood gas results and the surgical progress.

Management of haemorrhage in Exodontia

Once a tooth has been removed, pressure should be placed on the buccal and lingual/palatal surfaces of the alveolus around the socket. Extraction of a tooth via the intra-alveolar approach causes expansion of the alveolus around the root(s) of the tooth. The immediate buccolingual pressure reduces the 'dead space' of the wound and is the first step to help gain haemostasis [8]. This should be done immediately following the extraction of a tooth with intact apices, usually termed digital pressure. A piece of sterile gauze may then be rolled up so that it is big enough to cover the socket. This can be placed directly over the socket area and the patient asked to bite down to apply the necessary pressure. It is advisable in this case to use finger pressure on the gauze for several minutes. In many cases, this firm pressure will allow initial haemostasis to be achieved. The clot should begin at the base of the socket. It is a good idea to check that the clot is not removed with the gauze. A second piece of gauze can be placed in the same way.

Management of Haemorrhage in Soft Tissue

Soft tissue bleeding may be prolonged as a result of inflamed tissues or a mucosal tear. A local anaesthetic containing a vasoconstrictor may minimize the bleed initially.A large area of infection causes granulation tissue to form at the base of the socket. This may impair clotting and bleed profusely. Any unattached clots should be cleaned from the mouth and an assessment made. If the diagnosis is a soft tissue haemorrhage, the correct equipment should be used to achieve haemostasis. Various method involved are Suturing which will aid in socket closure and help bring the tissues together. Others chemical agent can be used such as tranexamic acid, ferricsulphate, silver nitrate.

Bleeding from the Socket

In case of bony haemorrhage bleeding from within the socket can be arrested by inserting pack. Cancellous bone can be burnished with a flat plastic instrument or a Mitchell's trimmer to help compress the bone in the area. Use of Haemostatic gauze such asoxidized regenerated cellulose13 (Surgical® a collagen sponge (Haem collagen®) or a resorbable gelatin sponge (Gel foam®) is recommended, along with suture placement when the patient is at high risk of a post-operative haemorrhage [9]. Bone wax consists of beeswax, paraffin and a softening agent. It may be used to control bleeding within cancellous bone.

Management of haemorrhage in third molar extraction

It is of note that impacted mandibular third molars show a higher risk of haemorrhage compared to maxillary third molars.

Tooth position and inclination including patient age are important factors in development of this complication; thus deeply positioned and distoangular or horizontally-positioned lower third molars show a higher risk of

haemorrhage. In the upper jaw high vertically-positioned third molars are most often implicated. Haematoma formation is seen with third molar extraction. Along with haematoma haemorrhage has been seen to develop in certain cases. It is important to mention that in many cases bleeding may lead to postoperative bleeding and the risk of haemorrhage is lower in cases of primary wound healing by hermetically suturing the socket.

Surgical intervention mainly involves suturing the extraction or bleeding site. Non-surgical haemostatic measures, or styptics, encompass an array of pharmacotherapies, sealants, adhesives, absorbable agents, biologics, and combination product.Common haemostatic agents used in oral surgery in extraction sites include the following:

Local pressure application with gauze oxidised cellulose, gel foam, thrombin, collagen fleece, cyanoacrylate glue, acrylic or surgical splints, local antifibrinolytic solutions, such as tranexamic acid mouthwash, fibrin glue or adhesive, resorbable gelatine sponge, collagen sponge, gauze soaked with tranexamic acid, chlorhexidine bio-adhesive gel, calcium alginate Haem coagulase, Ankaferd Blood Stopper, green tea extract, Chitosan-based dressings and bone wax [10]. Various combinations of surgical and non-surgical interventions have also been used, such as tranexamic acid mouthwash along with gelatine sponge and sutures, and fibrin glue with collagen fleece and sutures.

Management of post extraction haemorrhage

Types Of Post Extraction Haemorrhage

Haemostasis at the site of a dental extraction is considered to be a prerequisite before the patient leaves the clinic. Failure of haemostasis could occur in any patient; however, a number of different medical conditions and medications may interfere with this process. The classification of a haemorrhage is important as it has direct clinical implications. Post-extraction haemorrhage may be categorized in relation to timing [11]

1. Primary hemorrhage – the bleeding occurs at the time of the surgery;
2. Reactionary haemorrhage – 2–3 hours after the procedure as a result of cessation of vasoconstriction;
3. Secondary haemorrhage – up to 14 days after the surgery. The most likely cause of this is infection.

Figure 1: Risk assement of haemorrage in dental extraction

Timing	Risk Factor
Before	■ Medical complications (Table 2) ■ Anticoagulant/Antiplatelet medication
During	■ Traumatic extraction ■ Soft tissue laceration/tear ■ Large vessel damage ■ Oro-antral communication
After	■ Infection ■ Physical trauma to socket dissociating the clot ■ Failure to follow post-operative instruction

Figure 2: Armamenterium for post extraction haemorrhage

- Sterile gauze (pressure pack)
- Suction
- Suture kit
  - Needle holders
  - Tissue forceps
  - Suture material and needle
- Haemostatic gauze
- Bone wax
- Astringent solution, eg ferric sulphate
- 5% Tranexamic acid mouthwash
- Cautery
- Systemic monitoring equipment – blood pressure, heart rate and pulse oximeter

Conclusion

Post extraction haemorrhage is an unforeseen consequence, which can be very frightening for the patient and frustrating for the operator, it might require hospitalization if not managed well. Best ways of management are use of digital pressure, suture,

botroclot, gel foam, chitosan dressing, bone wax, haemostatic agent like ferric sulphate, silver nitrate, tranexamic acid, cyanoacrylate glue, use of cautery, cryostat. Although preoperative evaluation of the patient is mandatory to rule out any systemic disease coagulopathies such as haemophilia, thrombocytopenia, heparin overdose can lead to haemorrhage post extraction .and any to rule out any pathology using radiograph .However along with this the clinic should be well equipped with the emergency drugs, and the equipment's needed to bring haemostasis in the case of unforeseen haemorrhagic crisis along with the well trained medical staff who are well experienced in administration of the drugs.

References

1. Johnson AB, Burns B. Hemorrhage. Treasure Island (FL): StatPearls Publishing; 2022 Jan https:// www. ncbi. nlm. nih.gov/books/NBK542273/

2. Schoch H, Grasset to A, Schlimp CJ. Management of hemorrhage in trauma. J Cardio Thorac Vasc Anaesth. 2013 Aug;27(4): Spl): S35-43. 10.1053/j.jvca.2013.05.015. PMID: 23910535.

3. Kostiuk M, Burns B. Trauma Assessment. https:// www. ncbi. nlm. nih.gov/books/NBK555913/

4. Paden, M. (2005). Global collaboration on road traffic injury prevention. International Journal of Injury Control and Safety Promotion, 12(2), 85–91.

5. Kauvar, D.S., Wade, C.E. The epidemiology and modern management of traumatic hemorrhage: US and international perspectives. Crit Care 9 (Suppl 5), S1 (2005). https:// doi.org/10.1186/cc3779.

6. Cochran KA, Cavallari LH, Shapiro NL, Bishop JR. Bleeding incidence with concomitant use of anti-depressants and warfarin. Ther Drug Monit. 2011; 33:433-438.

7. Gaunt, C., & Woolley, T. (2014). Management of haemorrhage in major trauma. Continuing Education in Anaesthesia Critical Care & Pain, 14(6), 251–255. doi:10.1093/bjaceaccp/mkt065.

8. Padma Harish.V, Dinesh Prabhu.M Awareness of management of post extraction bleeding among dental students. International Journal of Scientific Development and Research (IJSDR) www.ijsdr.org IJSDR2104083.

9. Petersen JK, Krogsgaard J, Nielsen KM, Norgaard EB. A comparison between 2 absorbable haemostatic agents: gelatin sponge (Spongostan) and oxidized regenerated cellulose (Surgical). Int J Oral Surg. 1984 Oct;13(5):406-10. doi: 10.1016/s0300-9785(84)80066-6. PMID: 6209233.

10. Ockerman A, Miclotte I, Vanhaverbeke M, Verhamme P, Poortmans LL, Vanassche T, Politis C, Jacobs R. Local haemostatic measures after tooth removal in patients on antithrombotic therapy: a systematic review. Clin Oral Investig. 2019 Apr;23(4):1695-1708. doi: 10.1007/s00784-018-2576-x. Epub 2018 Aug 28. PMID: 30155575.

11. BaglinTP et al, on behalf of BCSH. Guidelines on oral anticoagulation (warfarin): third edition – 2005 update. British Journal of Haematology 2005: 132:277-285