





# **COMPLICATIONS OF PERIODONTAL SURGERY AND POST-OPERATIVE CARE**

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# OUTLINE

- Syncope
- Hemorrhage
- Local Anesthetic Toxicity
- Nerve Injuries
- Post-operative Care
  - Dentin Hypersensitivity

# SYNCOPE

- **Definition:**

sudden, transient loss of consciousness due to cerebral ischemia, followed within seconds to minutes by a gain of consciousness.

- The most frequently reported dental office emergency.

- Faintness refers to a lack of strength with a sensation of impending loss of consciousness (pre-syncope)

# CAUSES OF SYNCOPE

- Multitude of factors all with the same underlying pathogenic feature, reduced/altered cerebral blood flow
  - **inadequate vasoconstrictor mechanisms (vasodepressor syncope)**
  - hypovolemia
  - hypoxia
  - hypoglycemia

# VASODEPRESSOR/VASOVAGAL SYNCOPES

- Most probable form of syncope encountered in dental office in otherwise healthy patients
- **Predisposing factors:**
  - anxiety, stress, unexpected pain, sight of blood or instruments, age (16-35 yrs), and males
  - hypoglycemia or erect sitting or standing
  - beware of pts who report previous syncopal episodes

# PATHOPHYSIOLOGY

- Activation of “fight or flight response” results in increased release of catecholamines.
- This results in an increased blood flow to skeletal muscles (preparatory vasodilation) which in a sedentary person leads to decreased venous return and a decrease in mean arterial pressure

## PATHOPHYSIOLOGY (CONTINUED)

- Baroreceptors and the carotid/aortic arch reflexes sense the decrease in MAP and **compensate with sympathetic nervous system activation** resulting in increase heart rate, contractility, and peripheral vasoconstriction in attempts to preserve tissue perfusion.
- Initially, these mechanisms help to maintain blood pressure and tissue perfusion.
- However, **decompensation** soon develops as these mechanisms fatigue and vagally mediated bradycardia/hypotension develops leading to **decrease cerebral blood flow and syncope**



# CLINICAL SIGNS OF SYNCOPE

- Pre-syncope: early signs (fight or flight reflex and sympathetic compensation)
  - feeling of warmth in face and neck
  - loss of color
  - perspiration
  - nausea
  - tachycardia ( $> 120$  beats/min)
  - “I feel BAD”

# CLINICAL SIGNS OF SYNCOPE

- Pre-Syncope: Late Signs (related to failure of compensatory mechanisms)
  - Pupillary dilation
  - Yawning
  - Tachypnea
  - Hypotension
  - Bradycardia
  - Blurred Vision
  - Dizziness

# CLINICAL SIGNS OF SYNCOPE

- Unconsciousness and unresponsiveness
- Breathing: irregular or arrest
- Pupillary dilation
- Convulsive movements
- Bradycardia and weak pulse
- Hypotension (as low as 30/15mmHg)
- Muscular relaxation
- Short duration

# POST-SYNCOPE

- Pt regains consciousness
- Pallor, nausea, weakness, and sweating
- Mental confusion
- **BP** and **HR** return to baseline
- Pt may faint again, if raised to standing position too soon
- May take 24 hours for complete recovery

# PREVENTION OF SYNCOPE

- Thorough **medical and dental hx** (including level of dental anxiety)
- Proper **patient positioning** (especially during administration of local anesthesia)
- **Sedation**
- **Avoid** factors which cause **stress**: pain, view of blood/needles
- Minimize possibility of **hypoglycemia**

# MANAGEMENT OF SYNCOPE

- Trendelenburg Position (as soon as symptoms and signs appear)
- Remember A-B-C's
- Initiate Definitive Care:
  - Oxygen
  - Monitor Vital Signs

# MANAGEMENT OF SYNCOPE

- Additional Procedures (if necessary)
  - aromatic ammonia (beware with COPD and asthma)
  - IV access
    - fluids
    - atropine if bradycardia persists
- Activate EMS if recovery is not immediate as this is most likely not vasodepressor syncope

# MANAGEMENT OF SYNCOPE

- Recovery
  - Oxygen
  - Monitor vital signs
  - Determine Cause
  - Postpone treatment
  - Arrange for escort



# INTRAOPERATIVE BLEEDING

- Bleeding in periodontal surgery
- Management of intraoperative bleeding
- Predisposing medical conditions
- Predisposing medications
- Management of warfarin pts
- Local measures
- Pharmacological measures
- Plasma and factor preparations
- Fibrinolytic inhibitors

# INTRAOPERATIVE BLEEDING

- Periodontal surgery can produce profuse bleeding, especially **during the initial incisions** and **flap reflection**.
- After **full flap reflection** and the **removal of granulation tissue**, bleeding disappears or is considerably reduced.
- Excessive haemorrhaging after initial incisions and flap reflection may be caused by the **laceration of medium or large vessels**.



WHAT TO DO IF A MEDIUM OR LARGE VESSEL IS  
LACERATED?

# INTRA-OPERATIVE HEMORRHAGE

- **Prevention** is best form of management
- **Anatomical Considerations**
  - Greater Palatine Artery: beware with a shallow palatal vault
  - Nasal Palatine Artery: usually not a problem
  - Pterygoid Plexus of Veins: PSA injections
  - Mental Vessels
  - Inferior Alveolar and Lingual Artery (and branches): rare but potentially catastrophic



# INTRA-OPERATIVE HEMORRHAGE

- **Pressure** should be applied through the tissue to determine the location that will stop blood flow in the severed vessel.
- A **suture** can then be passed through the tissue and tied to restrict blood flow.
- **Excessive bleeding from a surgical wound** may also result from incisions across a capillary plexus. Minor areas of persistent bleeding from capillaries can be stopped by applying **cold pressure** to the site with moist gauze (soaked in sterile ice water) for several minutes.
- For a **slow constant blood flow** and for oozing, hemostasis may be achieved with **haemostatic agents**.
  - Absorbable gelatin sponge (Gelfoam), oxidized cellulose (Oxycel), oxidized regenerated cellulose (Surgicel Absorbable Hemostat), and microfibrillar collagen hemostat (CollaCote, CollaTape, CollaPlug) are useful hemostatic agents for the control of bleeding in capillaries, small blood vessels, and deep wounds

# ABSORBABLE HEMOSTATIC AGENTS

Generic (Brand)	Directions	Adverse Effects	Precautions
Absorbable gelatin sponge (Gelfoam)	May be cut into various sizes and applied to bleeding surfaces	May form nidus for infection or abscess	Should not be overpacked into extraction site or wound—may interfere with healing
Oxidized cellulose (Oxycel)	Most effective when applied to wound dry as opposed to moistened	May cause foreign-body reaction	Extremely friable and difficult to place; should not be used adjacent to bone—impairs bone regeneration; should not be used as a surface dressing—inhibits epithelialization
Oxidized regenerated cellulose (Surgicel Absorbable Hemostat)	May be cut to various shapes and positioned over bleeding sites; thick or excessive amounts should not be used	Encapsulation, cyst formation, and foreign-body reaction possible	Should not be placed in deep wounds—may physically interfere with wound healing and bone formation
Microfibrillar collagen hemostat (CollaCote, CollaTape, CollaPlug)	May be cut to shape and applied to bleeding surface	May potentiate abscess formation, hematoma, and wound dehiscence; possible allergic reaction or foreign-body reaction	May interfere with wound healing; placement in extraction sockets has been associated with increased pain
Thrombin (Thrombostat)	May be applied topically to bleeding surface	Allergic reaction can occur in patients with known sensitivity to bovine materials	Must not be injected into tissues or vasculature—can cause severe (and possibly fatal) clotting

# PREDISPOSING MEDICAL CONDITIONS

- **Hypertension:** not likely to be factor in perio surgery
- **Blood Dyscrasias:** hemophilia, thrombocytopenias, myeloproliferative disorders
- Most common - **von Willebrand's disease** occurs 1:10,000
  - increased PTT and BT

# PREDISPOSING MEDICATIONS

- **Five A's:**
  - Antibiotics
  - Aspirin
  - Anticoagulants (Coumarin drugs, Platelet Inhibitors, Heparin-like drugs)
  - Anti-neoplastics
  - Alcohol



# MANAGEMENT OF PATIENTS TAKING WARFARIN

- Get a **good hx** and **consult with physician** if necessary
- Get **baseline INR** and/or **INR day of surgery/injection**
- **DO NOT discontinue** if there is a hx of DVT or PE or a prosthetic heart valve.
- Most procedures can be accomplished with an **INR of 3.0 or less** (risk/benefit analysis)
- Schedule procedures in **AM** and **never on Fridays**
- Call patient the evening of surgery

# LOCAL MEASURES

- Pressure
- Local anesthetic with epinephrine
- Electrocautery
- Oxidized Cellulose (Surgicel)
- Absorbable Collagen Sponge (Gelfoam)
- Collagen Plug (Collaplug)
- Bone wax
- Bone punch/crush
- Acrylic stent
- Ligation

# PHARMACOLOGICAL MANAGEMENT

- Plasma Fractions
  - Factor VIII
    - ✓ Desmopressin
  - Factor IX
- Fibrinolytic Inhibitors

# PLASMA FRACTIONS

- Used to manage coagulation factor deficiencies
- Most common deficiencies:
  - **Factor VIII:** Hemophilia A
  - **Factor IX:** Hemophilia B
  - **Von Willibrand's Disease:** platelet adhesion and Factor VIII deficiencies
- Management depends on severity, therefore **consult with physician**

# FACTOR VIII PREPARATIONS

- **Cryoprecipitate:**  
obtainable from whole blood, 1/2 the activity of fresh frozen plasma in 1/10 the volume
- Purified or Recombinant **Factor VIII Concentrate**
- should maintain Factor VIII above 50% for 10-14 days post op

# DESMOPRESSIN (DDAVP)

- Acts on extrarenal receptors to **increase release of vWF and Factor VIII**
- Administered orally, nasally, or IV prior to procedure
- **Requires testing of response** prior to procedure (1-2 weeks)
- Indicated for minor surgical procedures in mild hemophilia A or von Willibrand's Disease

# FACTOR IX PREPARATIONS

- **Freeze-dried concentrates of plasma** are available which contain various concentrations of factor IX (and other factors)
- Preparations may contain active or inactive clotting factors

# FIBRINOLYTIC INHIBITORS

- E-aminocaproic acid (EACA)/Amicar
  - inhibits plasminogen activation
  - available for oral or parenteral use
  - can be used as mouthrinse
  - 5g during first hour of surgery followed by 1g/hr for about 8hrs or until hemostatic
  - can cause nausea, requires adjusted dose for renal compromise



# FIBRINOLYTIC INHIBITORS

- Tranexamic Acid/Cykloapron
  - analog of EACA with greater duration of action and potency
  - available for oral or parenteral use
  - oral administration: 25mg/kg 3-4x/day starting 1 day prior to surgery for 2-8 days post-op



# LOCAL ANAESTHETIC TOXICITY



# LOCAL ANESTHETIC TOXICITY

- **CVS Effects:**

- bradycardia, reduced contractility, hypotension, and eventually circulatory collapse

- **CNS Effects:**

- **initial effects (CNS stimulation)** include anxiety, agitation, dizziness, tremor, tonic/clonic convulsions
- Increasing dose may lead to progressive **CNS depression** and death from respiratory depression

# LOCAL ANESTHETIC TOXICITY

- Onset, intensity, and severity of symptoms vary according to **method of overdose**
- **Intravascular injections** produce *rapid onset*/ high intensity symptoms of short duration
- **Overdose** produces a *slow onset* of symptoms of gradually increasing severity with a long duration
- **Rapid absorption, slow biotransformation** or **elimination** are other methods of overdose

# MANAGEMENT OF LOCAL ANESTHETIC TOXICITY

- Prevention is best form of management
  - Know the **drugs** you administer
  - Always **aspirate**
  - Injections should be given **slowly** (60 sec for 1.8mL)
  - **Medical history**
    - slow biotransformation and elimination

# MANAGEMENT OF LOCAL ANESTHETIC TOXICITY

- Based on **severity**
- In most cases reaction is **mild** and **brief**, requiring **little or no specific tx**
  - Terminate procedure
  - Position pt comfortably and reassure pt
  - A,B,C's
  - Definitive Care
    - ✦ monitor vitals
    - ✦ oxygen
    - ✦ IV, titrated dose of midazolam or diazepam if seizure develops

# LOCAL ANESTHETIC ALLERGY

- **Rare** for ester type and even more rare for amides
- **Contact dermatitis** or **anaphylaxis**
- Usually related to **preservatives** in solution (methylparaben or bisulfites)
- Use preservative - free solution if you suspect allergy



# EPINEPHRINE OVERDOSE

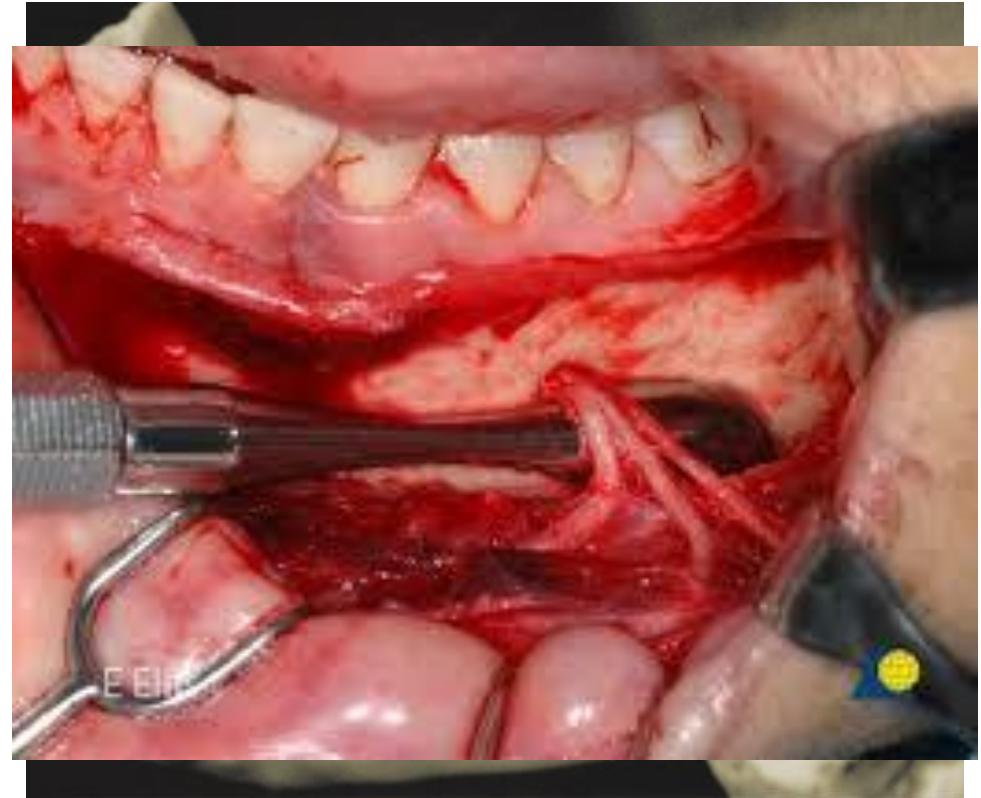
- **Signs:** elevated blood pressure and HR
- **Symptoms:** anxiety, headache, tremor, perspiration, palpitations, respiratory difficulty
- Usually of short duration due to MAO and catecholamine-O-methyltransferase, however pt may feel tired for prolonged period

# MANAGEMENT OF EPINEPHRINE OVERDOSE

- Again **prevention** is best and usually requires no tx
- **Supportive and monitoring measures** until BP and HR return toward baseline
- Could consider administration of **nitroglycerin** if BP does not return to baseline, however, beware of postural hypotension

# NERVE INJURIES

- Usually **lingual** or **mental nerve**
- Mucoperiosteal flaps are rarely elevated to level of mental nerve
- **Atrophy of mandibular ridge** should be taken into account
- The mental nerve can be visualized and isolated if necessary
- Lingual nerve injuries are rare with proper surgical technique and good judgement



# POST OPERATIVE CARE

- Wound Care and Oral Hygiene
- Reporting of adverse Signs and Symptoms
- Medications
- Common Post-operative Complications

# WOUND CARE

- If bleeding persists, place tea bag with pressure, avoid rigorous rinsing, and hot foods
- Avoid irritating/coarse foods
- Do not remove sutures, pull on them, or disrupt wound
- Avoid smoking
- Role of Periodontal Dressing

# ORAL HYGIENE

- Regular oral hygiene throughout rest of mouth
- Rinse 2x a day for 30 secs with **Chlorhexidine rinse** (1-2wks), then resume mechanical cleaning

## ADVERSE SIGNS AND SYMPTOMS

- Pt should be capable of contacting you in event of emergency (standard of care)
- Bleeding-if persists despite adequate local measures (by Pt. and Dr.), think systemically
- Infection
  - signs occur 3-4 days post-op (vs post operative edema)
  - fever, foul taste, swelling, suppuration, nodal involvement
  - difficulty swallowing

# MEDICATIONS

- Pts should be advised of potential adverse reactions to prescribed medications:
- **NSAIDs:** GI bleeding, CNS symptoms
- **Acetaminophen:** hepatotoxicity
- **Narcotics:** oversedation, respiratory depression, nausea
- **Antibiotics:** GI upset, organ system toxicity, allergy, superinfection
- **Chlorhexidine:** tooth staining, altered taste



## COMMON COMPLICATIONS

- **Pain:** acetaminophen, NSAIDs, narcotics
- **Post-op Swelling:** ice for 12 hours post-op and rest,
- **Hematoma/Ecchymosis:** 7-14 days
- **Bleeding:** pressure (gauze or tea bag)
- **Infection:** antibiotics and local measures
- **Delayed Healing:** beware of uncontrolled diabetics
- **Flap Necrosis**

# COMMON COMPLICATIONS

- **Tooth mobility:** should decrease in time
- **Root Sensitivity**
- **Trismus:** moist heat, and regular range of motion
- **Parasthesia:** documentation and follow-up
- **Recurrent Herpes** (labialis or intraoral)
  - consider prophylactic anti-viral use
  - palliative care

# MANAGEMENT OF ROOT/DENTIN HYPERSENSITIVITY

- **Warn patient** ahead of time!!!
- Determine Magnitude of Problem and Probable Etiology
  - does it interfere with daily activities or hurt only when they bite into a popsicle!!
  - etiology:
    - toothbrush abrasion
    - periodontitis
    - periodontal treatment

# TREATMENT

- Efficacy and predictability are highly variable, and tx is mainly empirical
- Available modalities reduce the functional diameter of dentinal tubules
  - Gel-Kam: stannous fluoride
  - Prevident: sodium fluoride
  - Fluoride Varnishes i.e. Duraflor
  - Toothpastes: ex Sensodyne (potassium nitrate)
  - Used of light cured unfilled resins (ex Fortify, Gluma)
  - If intractable- endodontic therapy is an option

### **BOX 55-2 Office Treatments for Dentinal Hypersensitivity**

#### Cavity varnishes

- Anti-inflammatory agents

#### Treatments that partially obturate dentinal tubules

- Burnishing of dentin
- Silver nitrate
- Zinc chloride–potassium ferrocyanide
- Formalin

#### Calcium compounds

- Calcium hydroxide
- Dibasic calcium phosphate

#### Fluoride compounds

- Sodium fluoride
- Stannous fluoride
- Iontophoresis
- Strontium chloride
- Potassium oxalate
- Restorative resins
- Dentin bonding agents



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