FRACTURE OF NOSE

FRACTURE NOSE

- Cause
- How to diagnose
- Decision to manipulate or not
- Timing of manipulation
- How to manipulate
- Complications

CAUSES (TRAUMA)
- RTA
- Contact sports
- Home accidents
- Occupational accidents
- Assault

DIAGNOSIS
- Swelling
- Oedema
- Periorbital bruising
- Surgical emphysema
- Crepitus
- Tenderness
- X-ray
- Check for associated injuries

ASSOCIATED INJURIES
- Orbital rim fracture
- Blowout fracture of orbit
- Maxilla fracture
- Fracture zygoma
- Fractured mandible

MANIPULATE OR NOT?

- If deformity is present then manipulate
- No deformity, no treatment
Timing of manipulation

• If no swelling then do it then & there
• If swelling has appeared then weight for swelling to subside
• Do it within three weeks

How to manipulate

• Close
• Ope

Complications

• Intractable bleeding
• Septal hematoma
• CSF leak
• Nasal deformity

RHINOLITHS & FOREIGN BODIES IN THE NOSE

• Children between the ages of 1 and 4 years sometimes insert foreign bodies into one or both nostrils, but this also affects adults especially those with psychiatric illness.
• Children more commonly insert foreign bodies in their nostrils, in addition they may also insert foreign bodies to relieve preexisting nasal mucosal irritation or epistaxis.
• A benign nasal foreign body may become life threatening if the object is dislodged into the airway.

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• Unilateral foreign bodies affect the right side about as twice as often compared to the left. This may be due to a preference of right handed individuals to insert objects in their right naris.

CLASSIFICATION

• It could be:
  1. inorganic, inert (plastic).
  2. organic (bean).
  3. battery.
4. insect.
5. toxic material (naphthalene).

**DANGERS**
- Injury from failed unskilled attempts
- Local spread of infection - sinusitis or meningitis.
- Inhalation of foreign bodies leading to lung collapse and infection.
- All foreign bodies harbor the potential for swallowing or airway obstruction if they are displaced posteriorly.

**PATHOPHYSIIOLOGY**
- Nasal foreign bodies can cause damage to the nasal cavity and the surrounding structures. They can produce local inflammation which may result in pressure necrosis. This in turn can cause mucosal ulceration and erosion into blood vessels producing epistaxis.
- The swelling can cause obstruction to sinus drainage and lead to secondary sinusitis.
- Firmly impacted and unrecognized foreign bodies can in time become coated with calcium, magnesium, phosphate or carbonate and become a rhinolith. Rhinoliths are radio-opaque and are typically found on the floor of the nasal cavity. Rhinoliths can remain undetected for years and only upon growth do they produce symptoms that lead to their discovery.

**Endoscopic picture of rhinolith in the right nasal cavity**

Coronal CT Image showing above rhinolith between the right inferior turbinate and the septum. In addition, the patient has bilateral sinusitis and a septal deviation.

**MORBIDITY AND MORTALITY**
- The foreign body itself may cause irritation to the patient; however morbidity is primarily caused by the resulting inflammation, mucosal damage and extension into adjacent structures.
Reported complications include sinusitis, acute otitis media, nasal septal perforation, periorbital cellulitis, meningitis, acute epiglottitis, diphtheria, and tetanus.

**CLINICAL FEATURES**

1. A fearful child; irritable, crying.
2. Unilateral foul smelling nasal discharge, sometimes blood-stained.
3. Excoriation around the nostril.

**HISTORY**

- In most cases, the insertion of the nasal foreign body (NFB) is witnessed, and the dilemma of diagnosis is eliminated. In one study, presentations over 48 hours after the time of insertion accounted for 14% of all cases. In addition to obtaining a thorough history from the patient and his or her primary guardian(s), it is important to interview all caretakers that have recently spent time with the patient (i.e., babysitters, counselors). Once the diagnosis is missed, the foreign body may not be detected for days, weeks, or even years.
- Among the delayed presentations, the most common clinical scenario is unilateral nasal discharge.
- Nevertheless, clinicians must entertain the diagnosis of NFB in all patients with nasal irritation, epistaxis, sneezing, snoring, sinusitis, stridor, wheezing, or fever.
- Some authors even report discovering NFBs as the etiology of more unusual patient presentations, such as irritability, halitosis, or generalized bromhidrosis (body malodor).

**PHYSICAL EXAMINATION**

- The physical examination is the main diagnostic tool, and a cooperative patient is essential for success.
- Parents and staff may be needed to comfort and immobilize a child to allow for a thorough otorhinolaryngologic examination.
- Sedation is often helpful in the pediatric population.
- Maximal visualization of the nasal cavity is obtained by wearing a head-lamp.
- Some authors recommend positioning children younger than 5 years in a supine lying position and older children in a sitting "sniffing" position to allow optimal visualization.
- A nasal speculum may also help to view the nasal cavity, although some authors report less patient anxiety and equally good visualization.
by using one's thumb to pull the nose upward.

**PHYSICAL EXAMINATION**

- In addition to adequate inspection of the nasal cavity, assessing for complications of the nasal foreign body is important.
- Visualize the tympanic membranes for signs of acute otitis media, assess for sinusitis, check for nuchal rigidity in the toxic child, and auscultate the chest and neck for wheezing or stridor, which may be a clue of foreign body aspiration.
- Lastly, looking for additional foreign bodies, whether they are in the nose or other body cavities, is important.

**DIFFERENTIAL DIAGNOSIS**

- Sinusitis.
- Polyps.
- Tumor.
- Upper respiratory infection (URI).
  - Unilateral choanal atresia.

**MANAGEMENT**

- In the case of a cooperative child it may be possible with head mirror or lamp and Thudicum’s speculum, to see and, with small nasal forceps or blunt hooks to remove the foreign body without general anesthetic.
- Local analgesia and decongestion are helpful and may be applied in the form of a small cotton-wool swab wrung out in Lidocaine or Phenelephrine solution. Extreme care is necessary.
- If a child came with an inert inorganic foreign body stuck in his nose and we couldn’t remove it from the first trial we do the following:
  1. send him home and ask the parents to bring him back the next day to remove it under general anesthesia.
  2. give him decongestant.
  3. give him antibiotics.
• The following should be removed immediately from the nose and can’t wait till the next day:
  1. insect.
  2. bean.
  3. battery: the alkaline material inside it can burn the nose and cause severe adhesions.
  4. toxic materials (naphthalene).

• A refractory child should, from the onset, be regarded as a case necessitating general anesthesia. This must be administered by an experienced anesthetist, and it is usual to employ an endotracheal tube. The surgeon may then remove the foreign body and need have no fear that it will enter the trachea.

• Rarely an adult complaining of nasal obstruction is found to have a large concretion blocking one side of the nose. This is a rhinolith and it consists of many layers of calcium and magnesium salts that have formed around a small central nucleus. The latter often contain a foreign body.

**CSF RHINHORREA - BASIC MANAGEMENT**

**INTRODUCTION**

• **CSF leak**
  - abnormal communication between subarachnoid space and extradural structures
  - Pressure gradient

• **CSF leaks**
  Rhinorrhea
  Otorrhea
  Skull base
  Spinal canal
SPONTANEOUS LEAKS

• Hypothesized that they are a result of embryologic development
  – Dehiscent fovea ethmoidalis, cribiform plate or sphenoid sinus
  – Patent craniopharyngeal canal (Rathke’s pouch)
  – Patent IAC/fallopian canal
  – Wide cochlear aqueduct
  – Patent Hyrtl’s fissure (transmits Arnold’s nerve from jugular foramen to middle ear)
  – Abnormally wide petromastoid suture
  – Dehiscent tegmen in temporal region
  – Mondini malformation

TRAUMATIC CSF LEAK

• Brodie et al. 820 temporal bone fractures
  – 122 patients with CSF fistulae
    • 97 otorrhea
    • 16 rhinorrhea
  – Only 5 had persistent drainage after 14 days of conservative treatment
  – 7 underwent OR for leak
  – 9 (7%) developed meningitis

DIAGNOSIS

History
  – Clear, water-like, unilateral discharge
  – Flow may change with alterations in posture and Valsalva
  – When supine, may have postnasal drip
  – Cessation of flow associated with headache
  – May occur after coughing or sneezing

Physical Examination
  Collect rhinorrhea if possible
  Intranasal exam may reveal encephalocele, but is usually unremarkable
  Try jugular compression, leaning forward and Valsalva
  Unilateral serous otitis media

CSF vs. nasal secretions
• Halo sign
  – Central area of blood with an outer ring or halo
  – Blood mixed with tap water, saline and rhinorrhea fluid also produces a ring

• Specific gravity of 1.006
• Low protein when compared to nasal secretions
  • Cutoff of below 2 g/L
• High glucose levels compared to nasal secretions
  • Cutoff of above 0.4 g/L
  • Negative glucose can help rule out CSF
  • Can use dextrose sticks in ED
• Lacrimal gland secretions and nasal mucus have reducing substances that can cause false positives

**Beta-2 Transferrin**

• First used in 1979
• Protein used in iron transport
• Beta-1 vs. Beta-2
  – Variations in sialic acid chains
• Beta-1
  – Serum, nasal secretions, tears, saliva
• Beta-2
  – CSF, perilymph and aqueous humor

**BETA-2 Transferrin**

• 0.5 mL sample in plain tube
• Electrophoresis with subsequent immunofixation with anti-transferrin antibodies
• Beta-2 migrates slower to the cathode
• False positives with alcoholic cirrhosis and genetic transferrin variants
• Transferrin loses 2 sialic acid residues and migrates between beta-1 and beta-2 bands
• Thus you need serum sample with suspected alcohol exposure
**IMAGING**

- High resolution CT (1mm) with coronal cuts

**CT CISTERNOGRAPHY WITH METRIZAMIDE**

- Tri-iodinated, nonionic, water-soluble compound
- Amipaque, administered intrathecally few hours before investigation, minimal side effects
- Depends on active leak
- Can try Valsalva, or intrathecal saline infusion to promote leak
- Sensitivity drops to less than 60% with inactive leaks

**MRI CISTERNOGRAPHY**

- Misnomer as it is really a highly weighted T2 image
- Can try intrathecal gadolinium
- Poor bony detail

**RADIOISOTOPE PLEDGETS**

- Use has fallen out of favor, but may still be useful in suspected slow leaks
- Pledgets in middle meatus and sphenoethmoidal recess left in for 24 hours with intrathecal administration of technetium-99
- Can try control pledget in upper lip
- Many false positives and negatives
- Problems with systemic absorption of radioisotope
  - Thus need impressively high counts for positive test
- Contamination from neighboring pledges minimizes localization

**INTRATHECAL FLUORESCINE**

- 0.5mL of 5% fluorescein diluted in 9.5mL of saline administered via LP several hours pre-op
- Complications such as seizures and weakness have been reported
- Need appropriate excitation and barrier filters
- Can use Woods lamp
- Topical fluorescein?
Conservative Management

- Most cases resolve with conservative measures alone
  - bed rest
  - elevation of head of bed
  - stool softeners
  - cough medications
  - Consider fluid restriction and diuretics

Lumbar Drains

- Two ways to drain
  - By pressure – set drain at certain level above patient’s ear/ventricles – e.g. 10cm, therefore any pressure greater than 10cm H2O will drain
  - By volume – 10 cc/hr and reclamp (20 cc/hr of CSF produced, 150mL total volume)
  - Drain should not be raised above the level of the ventricles

Prophylactic Antibiotics?

- Controversial
- Meningitis occurs in 25-50% of untreated cases
- Brodie 1997 – meta-analysis of traumatic leaks
  - 2.5% (6/237) of treated cases
  - 10% (9/87) no antibiotics
  - Depends on:
    - Duration of leakage
    - Site of fistula
    - Concomitant infection
    - resistant organisms
  - Antibiotics for spontaneous leaks have been less studied
  - Consider trial for 4-6 weeks

Surgical Management

- Indications:
  - Extensive intracranial injury
  - Intraoperative identification
  - Do not respond to conservative measures
  - Recurrent meningitis
  - Some authors suggest that non-operative repair of spontaneous leak is rarely permanent
- Intracranial/Open vs. Extracranial/Endoscopic
CONCLUSIONS

- Traumatic vs. Atraumatic Leaks
- Determine if there is a leak
- Determine where the leak is
- Consider conservative management, especially for traumatic leaks
- Immediate surgical repair for certain high risk leaks
- Endoscopic repair initially
- Consider intracranial repair for treatment failures and other high risk leaks

DNS SEPTOPLASTY SMR

AETIOLOGY OF D.N.S
- Congenital
- Trauma

PATHOLOGY
- Type of DNS
- Deviations- C shaped, S shaped
  - Spur
  - Anterior Dislocation
  - Duplication
- Turbinate hypertrophy
- Bridge deviation
- Vestibulitis

CLINICAL FEATURES
- NASAL OBSTRUCTION
  - Unilateral
  - Bilateral
  - Paradoxical
- EPISTAXIS
- PAIN-Anterior ethmoidal nerve syndrome

SIGNS OF D.N.S
External examination - Bridge deviation
Vestibule - Vestibulitis
Patency - Obstruction
Anterior rhinoscopy - Signs noted in pathology
Post. Rhinoscopy - Normal
Lymph nodes - Non specific

INVESTIGATIONS
• No investigations is required to diagnose DNS, it is diagnosed clinically
• Routine investigations
• X-ray PNS

TREATMENT OF D.N.S

S.M.R. & SEPTOPLASTY
SMR- Submucoperiosteal- perichondrial resection of deflected part of nasal septum
Septoplasty- Re-positioning of nasal septum into midline with minimal resection

INDICATIONS
– DNS
– Closure of septal perforation
– Source of grafting material
– As a part of rhinoplasty
– To obtain surgical access
  i Trans-septal Hypophysectomy
  ii Trans-septal sphenoidectomy

CONTRAINDICATIONS
– Any systemic condition which contraindicates anesthesia or surgery.
– Hypersensitivity to local anesthetic agent

ANAESTHESIA
• Local-4% xylocain +1:1000 adrenallin pack and I/V sedation-promethazine + pentazocine.
• General- Induction- Thiopentone sodium I/V
• Maintenance- Endotracheal intubation and oxygen, Nitrous oxide and halothane gases.

POSITION OF THE PATIENT ON THE OPERATION TABLE
- Anti-trendelenberg position with head side tilted by 15 degree
- Slight flexion of the neck and head

**Incisions**
- Freer incision- at the mucocutaneous junction.
- Killian incision- 0.5 cm behind mucocutaneous junction.
- Hemitransfixion incision- for septorhinoplasty

**TECHNIQUE**
- Elevation of flaps
- Resection of deflected part.
- Replacement of flaps
- Stitching
- Packing and Dressing

**Complications**
- Complications of Anaesthesia
- Complications of Surgery

**COMPLICATIONS OF ANAESTHESIA**
- Hypersensitivity reactions
- Cardiac arrest
- Apnoea
- Chest infections
- Injury to the oral cavity, tongue and larynx

**COMPLICATIONS OF SURGERY**
- Hemorrhage
- Injury to surrounding structures
- Septal hematoma
- Septal Abscess
- Sinking of bridge
- Perforation
- Flapping septum
- Columellar retraction
- Adhesions

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