Topical Antibiotic Irrigation (Gentamicin) in Prophylaxis of Midfacial Fracture Surgical Wounds

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Protocol Title:	Topical Antibiotic Irrigation (Gentamicin) in Prophylaxis of Midfacial Fracture Surgical Wounds
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Population:	Adult Patients admitted to Memorial Hermann Hospital (MHH) for treatment of Midfacial fractures
Number of Sites:	Memorial Hermann Hospital
Study Duration:	Prospective trial, 4 years
Subject Duration:	Associated hospital stays, Follow up to eight weeks postoperatively

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General Information

The purpose of this study is to evaluate the use of topical antibiotic irrigation (Gentamicin) and its ability to reduce surgical site infections in midfacial fracture surgery compared to sterile normal saline (NS).

Background Information

The Centers for Disease Control and Prevention estimates that 16 million surgical procedures were performed in acute care hospitals in the United States in 2010 (CDC). A recent study found that surgical site infections (SSIs) accounted for roughly 31% of all hospital acquired infections (HAIs) (Magill). The overall infection rate for traumatic midfacial fracture is about 9% (Lauder). Current regimens applied for prevention of SSIs include: preoperative antiseptic preparation and systemic parenteral antibiotic prophylaxis, intraoperative aseptic techniques, and postoperative incision care (Mangram). Intraoperative topical antibiotic irrigation intraoperatively is becoming more prevalent, supplementing the recommended use of intravenous prophylactic administration of antibiotics prior to surgery (Andreasen). Typical irrigation agents include sterile saline, Gentamicin, chlorhexidine gluconate, betadine, Bacitracin, and hydrogen peroxide. The majority of prospective references reviewed were limited to orthopedic, abdominal, ocular, breast, dermatologic, and cardiothoracic surgeries with a significant lack of sources referencing maxillofacial surgeries (McHugh). The available reports on the use of topical antibiotic irrigation in prophylaxis of facial surgical wounds is insufficient.

Objectives

- Does the use of topical antibiotic irrigation (Gentamicin) reduce surgical site infections in midfacial fracture surgery compared to sterile NS?

Study Design

- Prospective randomized trial: All groups with receive standard parenteral (IV) prophylactic antibiotic. In the control group, the fractures will be irrigated with sterile normal saline priorto closure. In the trial group, the fractures will be irrigated with Gentamicin topical antibiotic

(80mg diluted in 1L 0.9% NS) prior to closure. Patients will not receive postoperative oral antibiotics.

- Double blinded: Intraoperative irrigation will be concealed (saline vs Gentamicin) to the patient and the surgeon.
- Expected duration of study is about 4 years and subject participation is expected to be about 200.
- The primary outcome to be measured is the rate of surgical site infections. The main investigator (Dr. Demian) will determine SSI (evidence of infection: persistent swelling, fever, recurrent swelling, erythema, and purulent discharge). Statistical analysis plan will be multivariate: SSI, use of Gentamicin, type of fracture, past medical history, social history, days before surgery.
- Assessment of efficacy.
- Assessment of safety.

Gentamicin information – Topical use

- Please see separate package insert document for more detailed information
- A topical irrigation solution may be compounded by dissolving appropriate amount of Gentamicin injection or Gentamicin compounding powder in 0.9% Sodium Chloride injection or sterile water for injection for a final concentration of 0.08mg/mL.
- This drug is contraindicated in those individuals with a history of previous hypersensitivity or allergic reaction to it
- Dosage form: 8mg/Vial, injection
- Maximum doseage: 5 mg/kg/day IV/IM is FDA-approved maximum. There is no maximum dose stated for ophthalmic or topical administration.
- There is no premixed solution. The Gentamicin is obtained at the hospital pharmacy and is mixed with 0.9% normal saline in the operating room by the scrub tech under sterile condition with nurse practitioner supervision (Georgian Brown) in order to maintain the blind. 80mg will be used per patient.

Study Population

- Inclusion: All patients 18 years of age and older who are planned for open reduction internal fixation of midfacial fractures as part of standard of care
- Exclusion: Infected surgical sites, allergies to Gentamicin
- Recruitment: Will recruit all patients who are admitted to Memorial Hermann hospital at Texas Medical Center

Study Procedures

- Expected number of visits will be about 5. First visit will be for evaluation in emergency department. Second visit will be for surgery. Also, patient will be monitored in the hospital postoperatively and will be seen for follow up in clinic.
- Every case included will be randomized based on lottery system for intraoperative sterile saline vs Gentamicin irrigation
- Every administered agent will not be known to patient or surgeon
- Patient will be then followed and monitored as per standard of care (inpatient monitoring, clinic follow up after discharge, last follow up at 8 weeks)
- The following will be considered evidence of infection: persistent swelling, fever, recurrent swelling, erythema, and purulent discharge

- Patient information will be gathered to evaluate the type of surgery, medical history of patient, research intervention of irrigation, types of antibiotics used, inpatient recovery, and follow up care. The information will be recorded an encrypted separate electronic document to ensure protection of patient information: secureshare.uth.tmc.edu

Data and Safety Monitoring

- Adverse events are not expected
- Data will be collected and kept by designated research assistants, Duc Lam and Georgie Brown.
- Data will be kept on the secured website: secureshare.uth.tmc.edu
- Interpretation of all information and results to be calculated at the conclusion of the last follow up of the last case included in the study to reduce bias
- At the conclusion of the study, data kept will have no patient information but still will be stored in the secured location

Statistics

- The aim of this study is to mainly compare the statistical outcomes between each group. Once the data tabulation is completed, other statistical analysis may be pursued after consultation with the statistician in UT Health.
- Prior to data requisition, UTHealth statisticians, Dr. Ruby Benjamin-Gardner and Dr. MinJae Lee, were consulted for sample size calculation assistance.
- Given the prevalence of surgical wound infection in our target population is 9%, with a sample size of 100 per group (200 total), a type 1 error rate of 0.05 and a type 2 error rate of .80 (80% power), we will be able to detect a reduction of 9 percentage points, from 10% in the saline group to 1% in the topical antibiotic group.

Ethics

- IRB approval will be sought from CPHS. Start of project will be conducted only after all permissions and approval are granted. Chart reviews and data collection will be conducted only after all permissions and approval are granted
- Consent will be obtained from each patient using standard consent forms for the specific surgery. A separate research consent form will be completed by each patient discussing the research study specifically.
- Once IRB approval is granted, additional application to the respective hospital will be submitted individually to the respective research office and the offices of the respective chiefs of staff

Data handling and record keeping

- Data will be collected using medical record numbers avoiding any specific patient's identifiers
- Data will be secured in secureshare.uth.tmc.edu or similar UT Health approved storage media

Quality control and assurance

- Data collections will be performed by research assistants

Publication Plan

- Data and conclusion will be shared internally for quality improvement
- Data will be also shared in local and national professional meetings
- Future publications in professional journals

Attachments

- See specific data collection outline below

Data Collection

MRN		
Age		
Gender		
PMHx		
Medications		
Allergies		
Social history		
Injuries		
Type of fracture		
Days before Surgery		
Gentamicin		
No Gentamicin		
Post-op Hospital Course		
Follow up #1		
Follow up #2		
Infection		
No Infection		
Other Complications		

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