

COMPLICATIONS OF GLAUCOMA SURGERY

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Outline

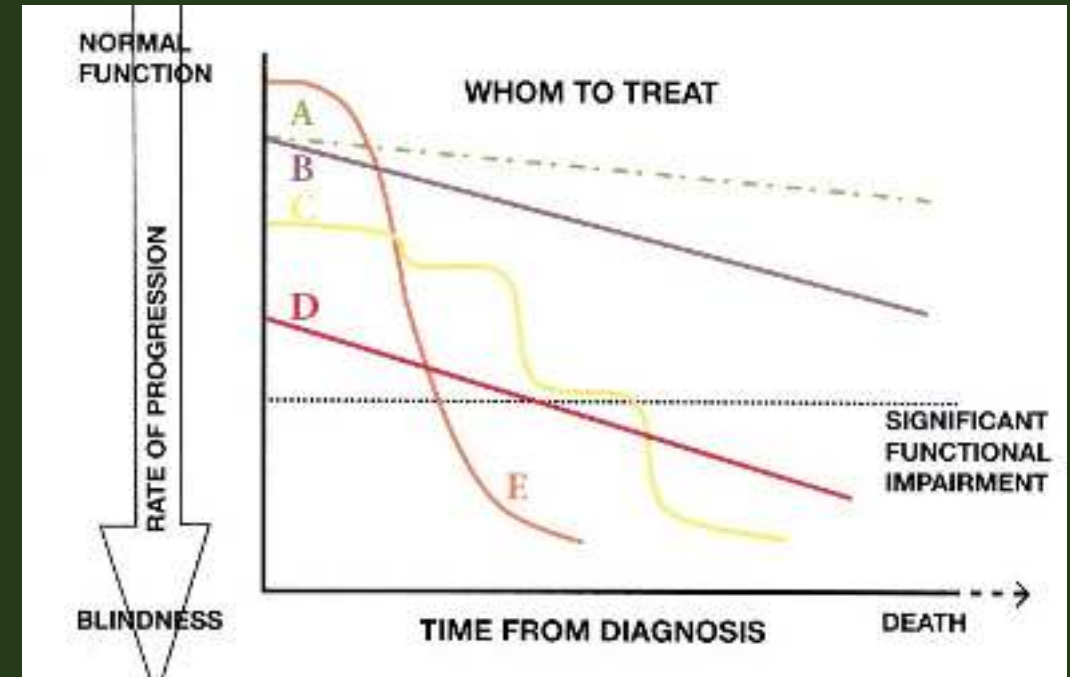
- Definition of a surgical complication
- Glaucoma management, When surgery is needed?
- Risks Vs benefits of surgical intervention
- Types of glaucoma surgeries
- Incidence (frequency) of complications of glaucoma surgery
- Risk factors of glaucoma surgical complications
- List of possible operative & postoperative complications
- Preventive measures of surgical complications
- Management strategies of surgical complications

DEFINITION OF A SURGICAL COMPLICATION

- Any undesirable, unintended & direct result of an operation affecting the patient
- This could be:
 - Avoidable or unavoidable
 - Negligent or non-negligent
 - Surgeon effect or the effect of the underlying disease or the condition of the patient

Glaucoma Management: DECISION OF SURGICAL TREATMENT DEPENDS UPON:

- Patient's own sense of visual function
- Amount of loss in the nerve and field.
- Rate of progression of glaucoma
- Magnitude & duration of pressure elevation
- General health and life expectancy of the patient
- Response to other treatment modalities (meds, lasers)
- Course of the contralateral eye



BENEFITS & RISKS of SURGICAL INTERVENTION

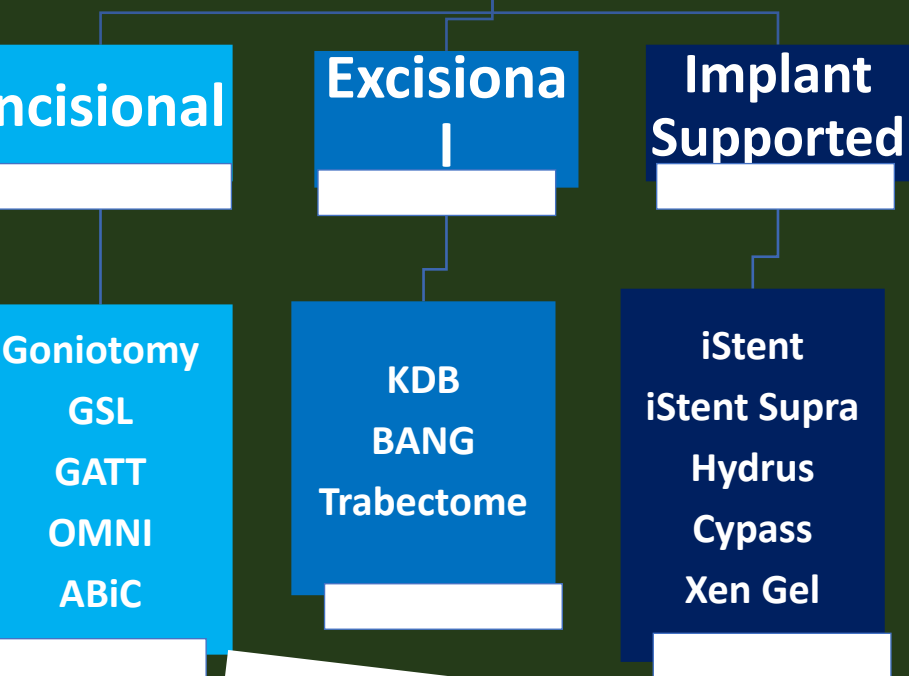
• For the patient:

- The hope to permanently reduce eye pressure & delay or stop glaucoma progression & minimize cost & side effects of medications
- Exposing the eye and the patient to surgery and anesthesia risks (from minor effects up to visual loss or death)
- Spending much stress, money, and time of patient & surroundings during & after the operation

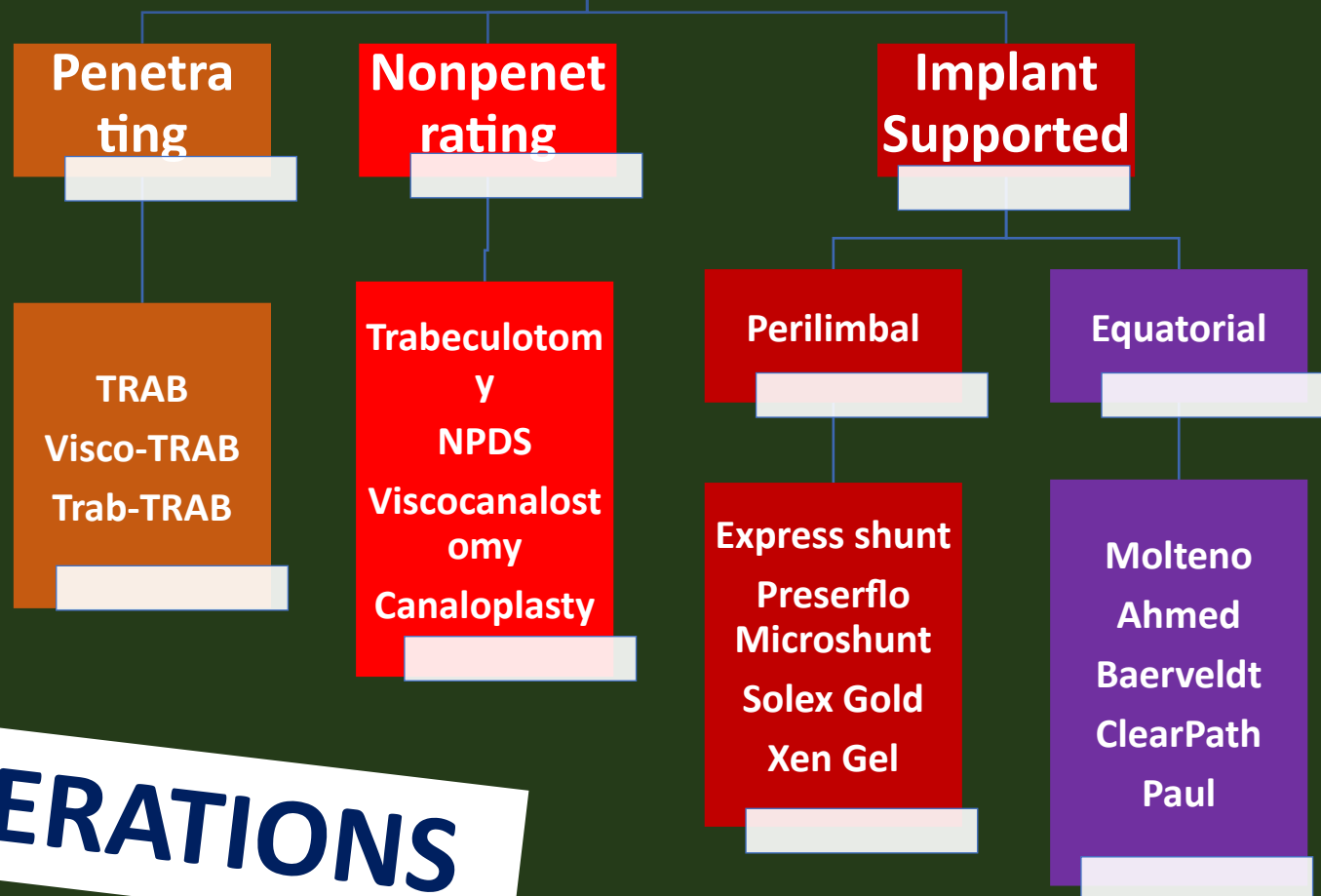
• For the surgeon:

- Utilization of extra tool of management, satisfaction, developing more surgical skills, gaining more money
- Extra effort in dealing with postoperative course and incident complications
- Facing consequences when results are less than expected
- Increasing likelihood of medicolegal issues

Ab Interno



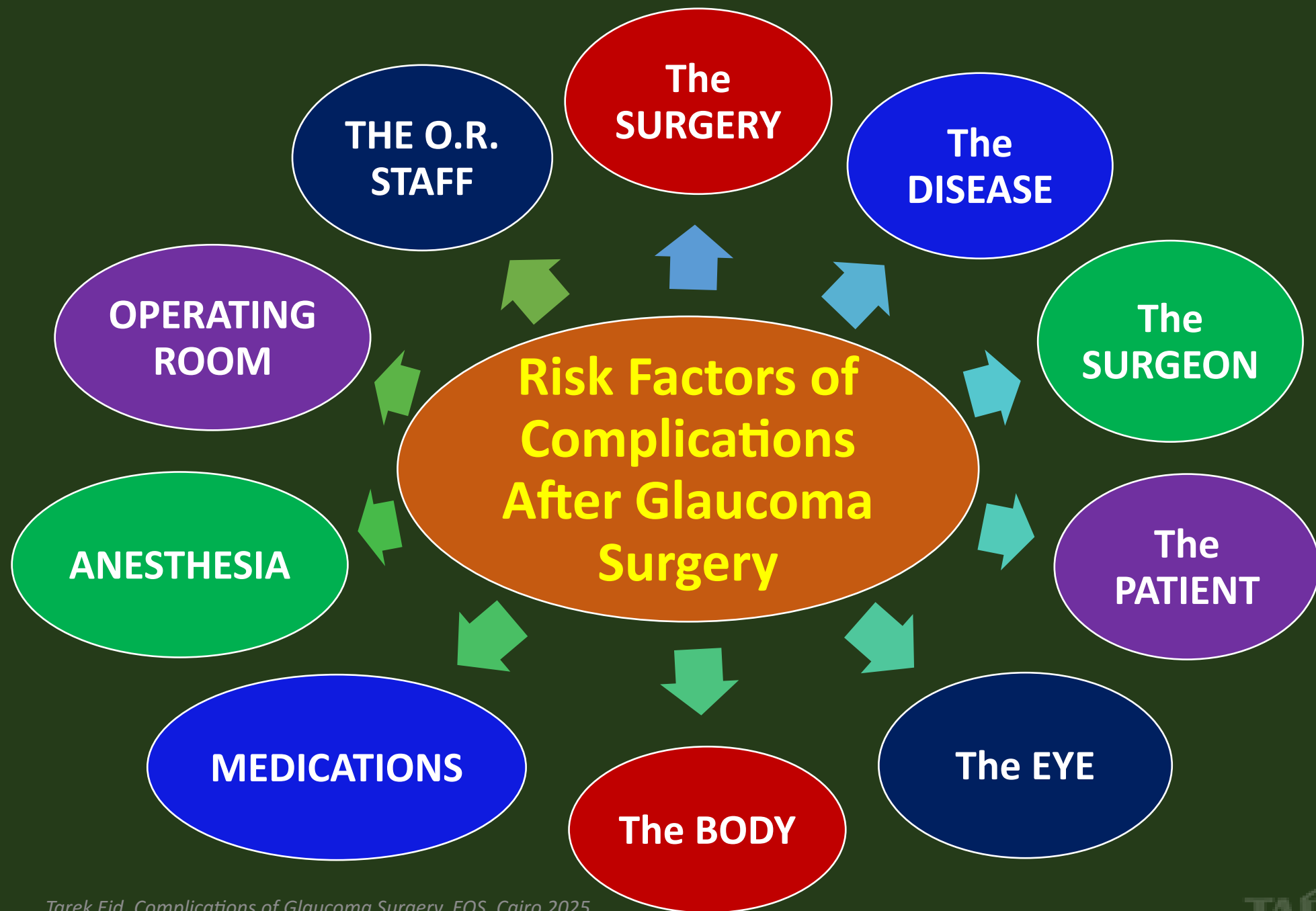
Ab Externo



GLAUCOMA OPERATIONS

INCIDENCE OF COMPLICATIONS OF GLAUCOMA SURGERIES

- Generally Up to 50%
- *CIGTS Study: 50% in USA*
- *National Survey in UK 46%*
- *TVT study:*
 - *57% after TRAB*
 - *37% after Tube*
- *Jampel HD, Musch DC, Gillespie BW, et al. Perioperative complications of trabeculectomy in the Collaborative Initial Glaucoma Treatment Study (CIGTS). Am J Ophthalmol. 2005;140:16–22*
- *dmunds B, Thompson JR, Salmon JF, Wormald RP. The national survey of trabeculectomy. III. Early and late complications. Eye. 2002;16:297–303*
- *Gedde SJ, Herndon LW, Brandt JD, et al. Surgical complications in the tube versus trabeculectomy study during the first year of follow up. Am J Ophthalmol. 2007;143:23–31*



Risk Factors of Complications After Glaucoma Surgery

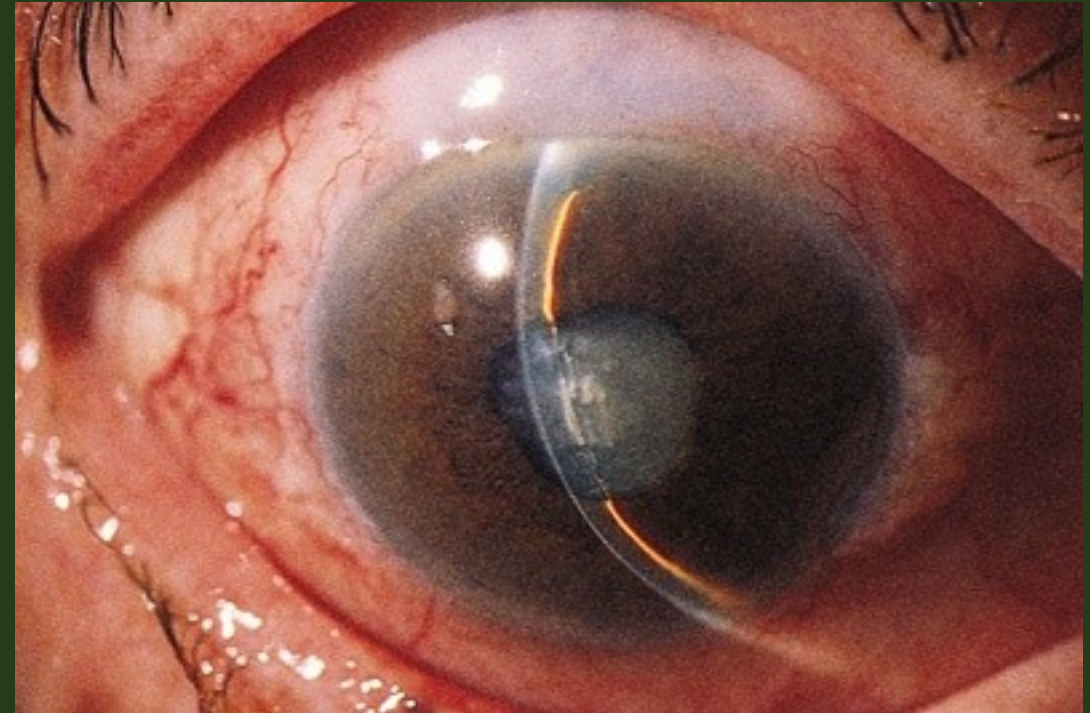
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|----------------|--|
| 1. The SURGERY | <ul style="list-style-type: none">• Certain types have high risk of comp.: full-thickness op, Trab, Tube• Prolonged operative time• Emergency operations• Combinations of multiple surgeries |
| 2. The DISEASE | <ul style="list-style-type: none">• Advanced stage with fixation splitting• Disturbed anatomy: 2ry glaucomas post ocular Sx, congenital anomalies• Preop. risks: persistently elevated IOP, neglected acute attack |
| 3. The SURGEON | <ul style="list-style-type: none">• Incompetent, Inexperienced, lack of patience, focusing, & accountability |
| 4. The PATIENT | <ul style="list-style-type: none">• Age (very young, very old), Males, anxious, noncompliant, intolerant, indocile |
| 5. The EYE | <ul style="list-style-type: none">• Associated pathologies, previous surgeries, high ocular comorbidity |

Risk Factors of Complications After Glaucoma Surgery

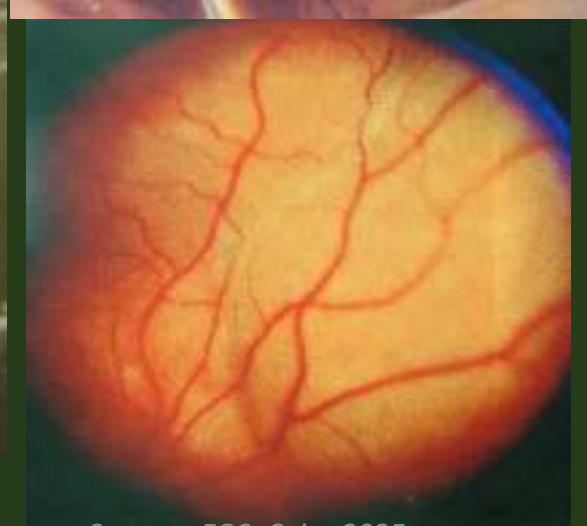
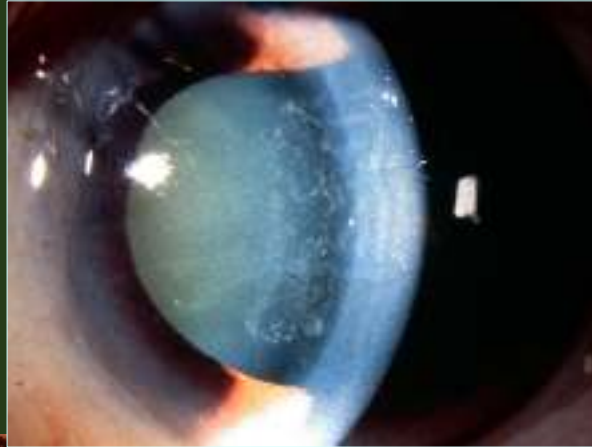
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|-----|-----------------------|--|
| 6. | The BODY | <ul style="list-style-type: none">• Frailty, poor healing power, septic focus, High morbidity & mortality risks• Systemic dis affecting postop course: DM, COPD, Obesity, HTN, Renal failure,.. |
| 7. | MEDICATIONS | <ul style="list-style-type: none">• Prolonged glaucoma medications affect conj & cornea• High risk if not discontinued: Pilocarpine, systemic CAls, anticoagulants• Chronic steroid therapy may decrease healing power |
| 8. | ANESTHESIA | <ul style="list-style-type: none">• Risks of anesthesia on patient, improper anesthesia may endanger the surgery |
| 9. | The O.R. | <ul style="list-style-type: none">• Lack of standardization, poor equipment, poor sterilization techniques |
| 10. | The O.R. STAFF | <ul style="list-style-type: none">• Poor training, lack of experience, lack of harmony and cooperation in the team |

List of possible operative & postoperative complications

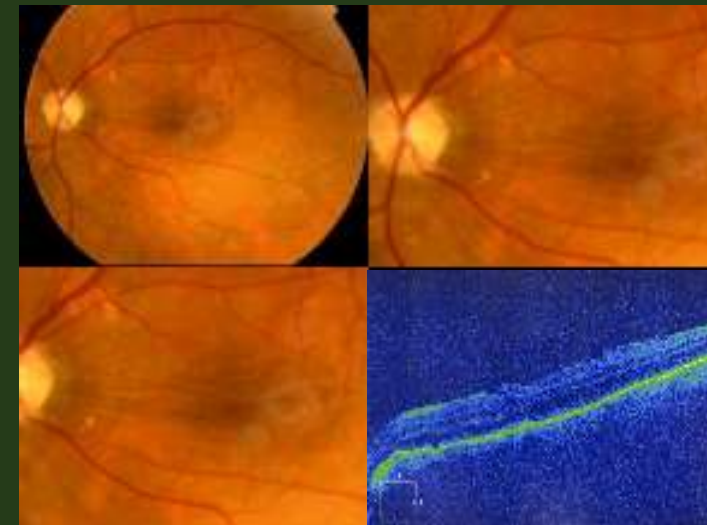
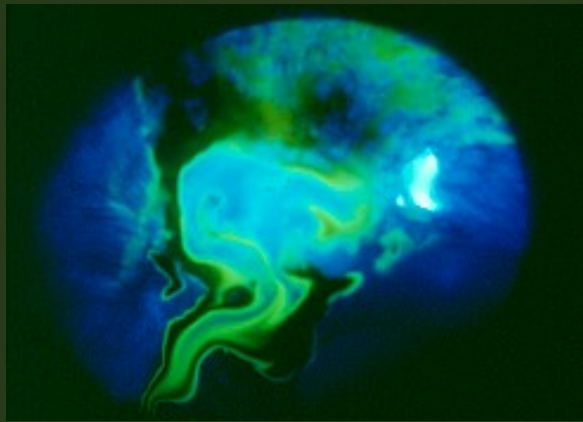
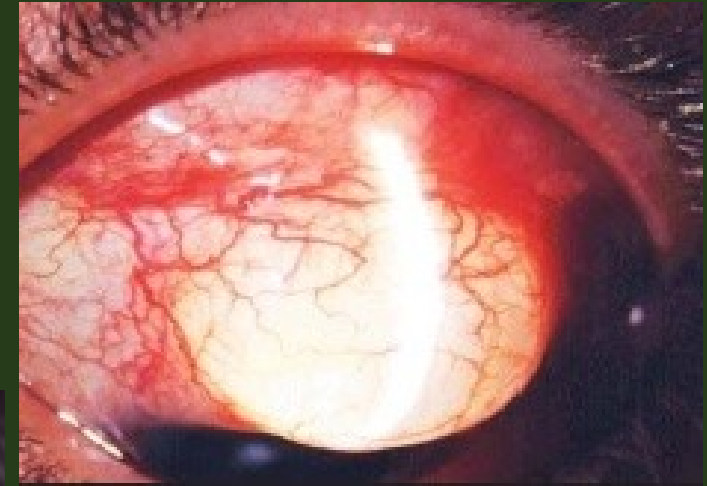
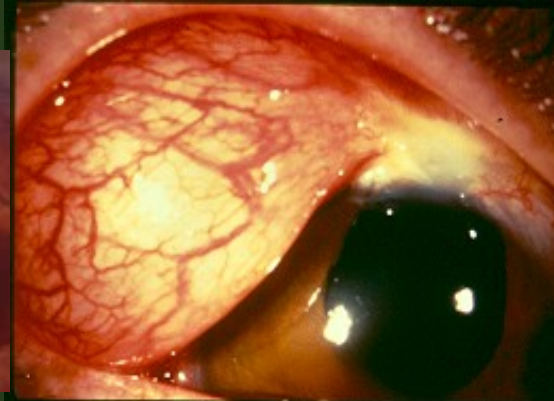
1. INJURY
2. BLEEDING
3. INFECTION
4. SCARRING
5. PRESSURE TURBULANCE
6. VISUAL LOSS
7. STRUCTURAL CHANGES
8. COSMETIC EFFECT
9. SYSTEMIC EFFECTS
10. PSYCHIC PROBLEMS



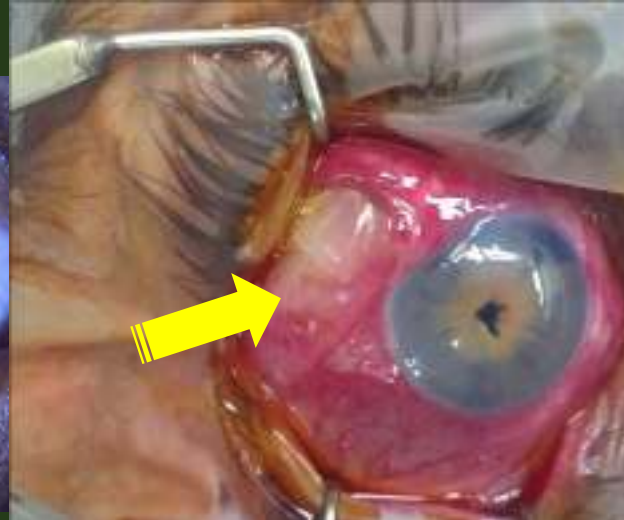
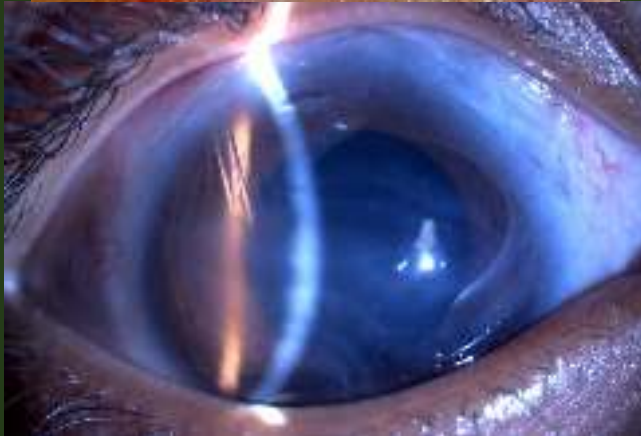
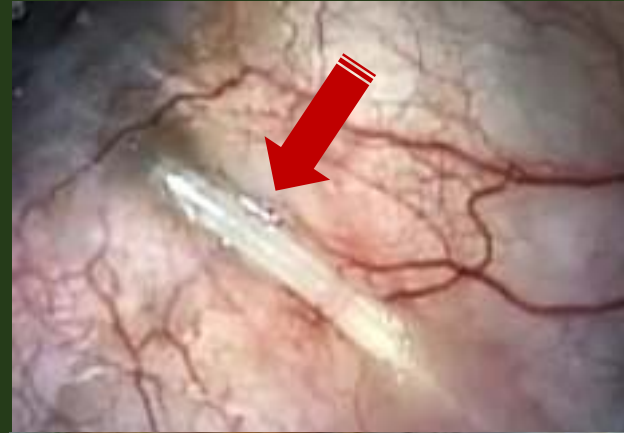
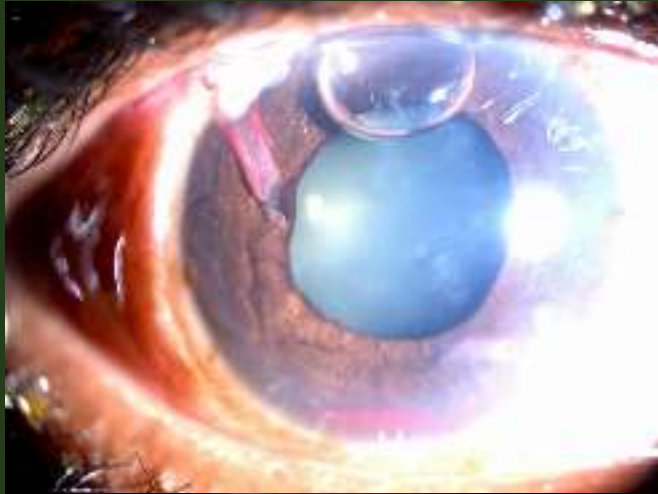
List of possible operative & postoperative complications



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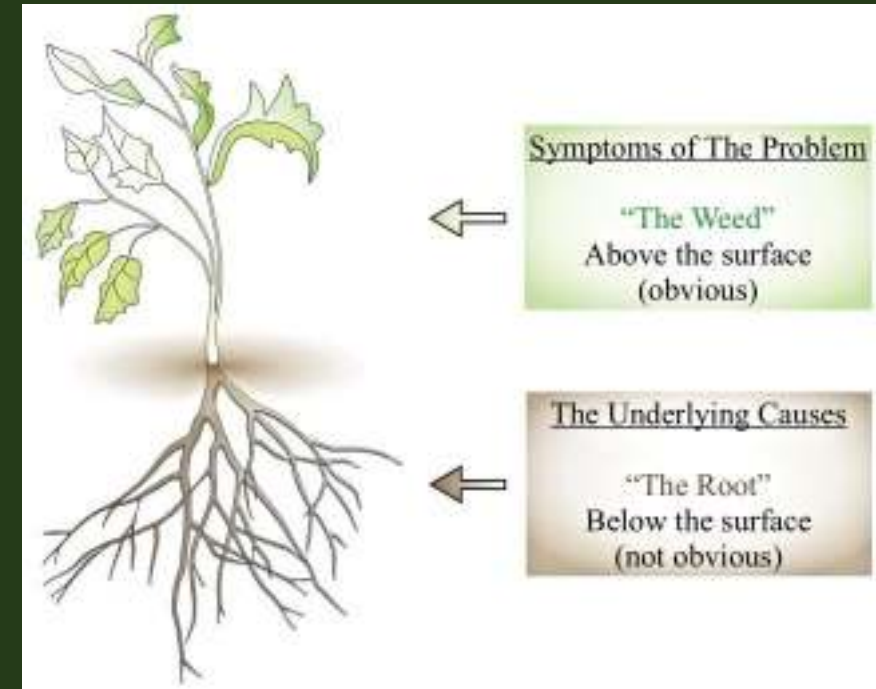
List of possible operative & postoperative complications



Management Strategies of Surgical Complications

Root-Cause Analysis

- Identify & define the **EFFECT**
- Identify the main **CAUSES** contributing to the effect
- Identify **FACTORS** that contribute to the main causes
- Effective **RECOMMENDATIONS** are generated for those causal factors



Chung KC, Kotsis SV. Complications in Surgery: Root Cause Analysis and Preventive Measures. *Plast Reconstr Surg*. 2012 June ; 129(6): 1421–1427. doi:10.1097/PRS.0b013e31824ecda0.

Preventive Measures of Surgical Complications

Preventive Measures

- **COMMUNICATIONS** of surgical team for preop briefing of patient data & surgical procedure
- A surgical **CHECKLIST** helps to avoid oversights & reduce distraction in O.R.
- **REPORTING SYSTEM** of operative notes and any unintended events
- **EVIDENCE-BASED MEDICINE** maximally improve patient safety
- Addressing & treating all **RISK FACTORS** preoperatively

The image shows the World Health Organization Surgical Safety Checklist (First Edition). It is a three-column checklist designed to be used at three key points in a surgical procedure: 'Before induction of anaesthesia', 'Before skin incision', and 'Before patient leaves operating room'. Each column has a header 'SIGN IN', 'TIME OUT', and 'SIGN OUT' respectively. The checklist includes various items to be checked, such as patient identity, consent, allergies, and equipment availability. A note at the bottom states: 'THIS CHECKLIST IS NOT INTENDED TO BE COMPREHENSIVE. ADDITIONS AND MODIFICATIONS TO FIT LOCAL PRACTICE ARE ENCOURAGED.'

Before induction of anaesthesia	Before skin incision	Before patient leaves operating room
SIGN IN <ul style="list-style-type: none"> PATIENT HAS CONFIRMED: <ul style="list-style-type: none"> IDENTITY DATE PROCEDURE CONSENT SITE MARKED (NOT APPLICABLE) ANAESTHESIA SAFETY CHECK COMPLETED PULSE OXIMETER ON PATIENT AND FUNCTIONING DOES PATIENT HAVE A: <ul style="list-style-type: none"> KNOWN ALLERGY? <ul style="list-style-type: none"> NO YES DIFFICULT AIRWAY/ASPIRATION RISK? <ul style="list-style-type: none"> NO YES, AND EQUIPMENT/STAFF/PLAN AVAILABLE RISK OF EXCESSIVE BLOOD LOSS: <ul style="list-style-type: none"> NUMBER IN CHARGE NO YES, AND ADDITIONAL INTERFERENCES ACCESS AND FLUIDS PLANNED 	TIME OUT <ul style="list-style-type: none"> CONFIRM ALL TEAM MEMBERS HAVE INTRODUCED THEMSELVES BY NAME AND ROLE SURGEON, ANAESTHESIA PROFESSIONAL AND NURSE VERBALLY CONFIRM: <ul style="list-style-type: none"> PATIENT SITE PROCEDURE ANTICIPATED CRITICAL EVENTS <ul style="list-style-type: none"> SURGEON'S REVIEW: WHAT ARE THE CRITICAL OR UNEXPECTED STEPS, OPERATIVE DURATION, ANTICIPATED BLOOD LOSS? ANAESTHESIA TEAM REVIEW: ARE THERE ANY PATIENT SPECIFIC CONCERNS? STERILIZATION REVIEW: HAS STERILITY INCLUDING INDICATORS/RESULTS BEEN CONFIRMED? ARE THERE EQUIPMENT ISSUES OR ANY CONCERNS? HAS ANTIBIOTIC PROPHYLAXIS BEEN GIVEN WITHIN THE LAST 60 MINUTES? <ul style="list-style-type: none"> YES NOT APPLICABLE ESSENTIAL IMAGING DISPLAYED? <ul style="list-style-type: none"> YES NOT APPLICABLE 	SIGN OUT <ul style="list-style-type: none"> NURSE VERBALLY CONFIRMS WITH THE TEAM: <ul style="list-style-type: none"> THE NAME OF THE PROCEDURE BEING DONE THAT INSTRUMENT, SPONGE AND NEEDLE COUNTS ARE CORRECT (OR NOT APPLICABLE) HOW THE SPECIMEN IS LABELLED (INCLUDING PATIENT NAME) WHETHER THERE ARE ANY EQUIPMENT PROBLEMS TO BE ADDRESSED SURGEON, ANAESTHESIA PROFESSIONAL AND NURSE REVIEW THE KEY CONCERNS FOR RECOVERY AND MANAGEMENT OF THIS PATIENT

- Haynes AB, Weiser TG, Berry WR, et al. A surgical safety checklist to reduce morbidity and mortality in a global population. *N Engl J Med*. 2009; 360:491–499.
- Chung KC, Kotsis SV. Complications in Surgery: Root Cause Analysis and Preventive Measures. *Plast Reconstr Surg*. 2012 June ; 129(6): 1421–1427..

Preventive measures of complications of GLAUCOMA SURGERY

BEFORE SURGERY

- Stop anticoagulants & miotics
- Prophylactic antibiotics
- Treat any source of infection in the eye & body
- Treat intraocular inflammation
- Reduce IOP, IV mannitol if necessary
- Proper patient counseling regarding the operation, treatment outcome & expectations, & possible complications

DURING SURGERY

- Proper selection of anesthesia type
- Meticulous handling of tissues
- Avoid prolonged loss of AC (viscoelastic or AC maintainer)
- Avoid hypotony (preplaced flap sutures with titration of filtration)
- Cycloplegics at end of operation especially in ACG
- Primary ZHV if high risk of malignant glaucoma
- Prophylactic sclerostomy if high risk of suprachoroidal hemorrhage

Preventive measures of complications of GLAUCOMA SURGERY

AFTER SURGERY

- Close follow-up & assurance
- Minimize anxiety & mental stress
- Restrict physical activities (running, bending, weight lifting, ...)
- Avoid straining (sneezing, coughing, nose blowing, constipation, ...)
- Cycloplegics are very useful early postop (deepen AC, quieten the eye)
- Head up position if there is hyphema

AFTER SURGERY

- Keep an eye on general condition of the pt, & proper control of systemic illnesses
- Measures to manage overfiltration (LBCL, pressure patch, symblepharon ring...)
- Early detection & treatment of conjunctival leakage
- Measures to manage high IOP (massage, LSL, releasable sutures, needling, flap lift, add drops,...)

CONCERNING MEDICOLEGAL ISSUES

في ضوء قانون المسائلة الطبية الجديد

If your safety is
the main issue

**DO
NOTHING**

If your patient's safety is
the main issue

**DO NOTHING
UNNECESSARY**