Endophthalmitis Prophylaxis

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Endophthalmitis Facts

- Endophthalmitis is an devastating but thankfully infrequent complication of cataract surgery
- Rates: 0.05 to 0.7% mean 1 in 1000
- Endophthalmitis rates falling
  - Bascom Palmer Institute
    - 0.09% for 1983-94
    - 0.05% for 1995-2001 ($p=0.031$)

Where do the bugs come from?

- >80% microbes arise from ocular flora
  - Vitreous tap microbes genetically identical to ocular/nasal flora
    - Speaker MG et al Ophthalmology 1991;113:1479-96
- **PARADOX:** 14% AC taps pre and post surgery were culture positive in 511 phaco and 189 ECCEs
  - Prospective observational study showed preop antibiotics or lacrimal irrigation no effect on culture
  - No cases of endophthalmitis resulted
    - Mistlberger A et al J Cat Refr Surg 1997;23:1064-9

What do we want!

Prophylaxis

- Aim is to decrease the risk of endophthalmitis by reducing the microbial load and suppress their intraocular growth
- Number of techniques described in literature
    - Ciulla TA et al Ophthalmology 2002;109:13-26
- What is proven?

Bacterial Endophthalmitis Prophylaxis for Cataract Surgery

An Evidence-based Update

Thomas A. Ciulla, MD,[1] Michael B. Starr, MD,[2] Samuel Masket, MD[3]

1. Betadine, Betadine, Betadine

- Best supported by the literature
- Given highest rating in review
- Prospective, open label, non randomised trial of 8083 patients showed reduced endophthalmitis
  - 5% Betadine 1 in 1745 vs Silver 1 in 418 ($p<0.03$)
    - Speaker MG et al Ophthalmology 1991;98:1769-75
- Randomised 2.5% Betadine skin vs skin and conjunctiva in 4110 showed no difference
    - Mork P Acta Ophth 1987;65:572-4
- Betadine post op more effective than antibiotics
    - Apt L et al Am J Ophth 1995;119:701-5

TRADE MARK

KALYPTOS

AN ANTISEPTIC WASH FOR THE FACE AND HANDS

THE APPLICATION OF THIS PREPARATION AFTER SHAVING WILL RENDER ANTISEPTIC THE FACE OF THE CUSTOMER AND THE HANDS OF THE BARBER. IT PREVENTS INFECTION AND IS INDISPENSABLE IN WELL REGULATED BARBER SHOPS

PRICES

PER QUART .30
PER ½ GALLON .55
PER GALLON .00

PREPARED BY
THEO. A. KOCHS COMPANY
CHICAGO

Half Strength
Povidone-Iodine
Solution

100mL

1. Betadine, Betadine, Betadine

- Sydney Eye Hospital very low endophthalmitis rate (1 in 3000 pts)
  - 2000 surgeries per year
  - >20 Anaesthetists
  - >60 VMOs / Registrars
  - >30 OT RNs / Trainees / Postgrads
  - >50% cases by registrars
  - All public patients
- What is making the risk so low?

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- What is making the risk so low?
  - All patients plenty of betadine (Anaesthetists)

2. Subconjunctival Abs

- Historically & Physiologically effective
- Two non randomised prospective trials show subconj Penicillin + Chlorsig reduced endophthalmitis rate ($p<0.05$) cf Chlorsig
  - 6618 pts Christey NE etal AnnOphth 1979;11:1261-5
  - 974 pts Kolker AE et al Am J Ophth 1967;63:434-9
- Additional studies have showed efficacy
  - Case-Control Lerts S et al Cl Exp Ophth 2001;29:400-5
  - Large Series Colleaux et al CaJOphth 2000;35(7):373-8
  - Endophalmitis Population Study of WA (EPSWA) Sixth report J Cat Refract Surg 2007;33: 269-80

3. Intracameral Antibiotics

- European Endophthalmitis Study Group
- 15 971 patients randomised
- 23 centres
- Largest ever RCT of antibiotics!!!
- 2x2 design
- All patients had betadine and post op levofloxacin qid for 1 week

Intra-cameral cefuroxime + Levofloxacin peri-op drops	Levofloxacin only (5 drops pre and post op)
Intra-cameral cefuroxime (1mg in 0.1ml NS end of case)	Placebos

Results

Intra-cameral cefuroxime + Levofloxacin peri-op drops	Levofloxacin only (5 drops pre and post op) 7 cases
Intra-cameral cefuroxime (1mg in 0.1ml NS end of case)	Placebos 9 cases

Results

Intra-cameral cefuroxime + Levofloxacin peri-op drops **1 case**	Levofloxacin only (5 drops pre and post op) 7 cases
Intra-cameral cefuroxime (1mg in 0.1ml NS end of case) **2 cases**	Placebos 9 cases

3. Intracameral Antibiotics

- Trial had to be stopped 13th Jan 2006!
- After 13 698 patient results received there was a clear benefit – unethical to continue
- No intra-cameral = 23 cases/6862 pts
- Intracameral = 5 cases/6836 pts
- 5 times reduced risk ($p=0.002$)
- Risk from 1 in 300 to 1 in 1500!
- Antibiotic drops small but not significant effect

3. Intracameral Antibiotics

- Practical considerations
- Revolutionary
- IV cefuroxime not available in Australia
  - GlaxoSmithKline not interested
- Use other cephalosporins
  - Keflin/Cephalothin same dose
  - Popular in private practise
  - Safety data not as reliable
  - Studies proceeding

What is effective but not proven?

What is effective but not proven?

- Sterile surgical technique
  - Critical
  - Number of potential points of infection
    - Hand washing / sterile gloves / mask
    - Draping / isolation
    - Equipment / Instruments / Tubing
    - Operating theatre / number of staff

What is effective but not proven?

- Active patient sepsis / local infection
  - Conjunctivitis, severe blepharitis, chalazion
  - Even URTI. UTI, skin infections

What doesn't work!

1. Preop Methods

- Lash Trimming & Saline Irrigation: no effect
- Preoperative Antibiotics
  - scarce literature, no prospective trials
  - Reduce bacterial load but up to 95% of conjunctival cultures remain positive
  - No drug provides complete coverage
  - 3 day course of Neosporin is equal to preop 5% betadine
    - Speaker MG et al Ophthalmology 1991;98:1769–75

2. Irrigating Solution Abs

- Controversial
- **FOR**
  - Large uncontrolled series
    - J Gills MD Florida
    - German series
  - Evidence of residual AC bacteria
  - Bacteriological studies showing efficacy over Betadine
- **AGAINST**
  - Case reports still happens
  - 2hr wash out
  - Slow "kill-kinetics"
  - Bacterial tolerance
  - Selection of resistant bugs
  - Poor Gram –ve cover
  - Toxicity
  - Cost

2. Irrigating solution Abs

- Evidence against its use
- Individual surgical choice

3. Wound Site or IOLs?

- German survey showed increased endophthalmitis risk with temporal clear corneal wounds
    - Schmitz S et al Ophthalmology 1999;106:1869-77
- Suggestion that topical anaeastheia increases risk
    - Ellis MF Clin Exp Ophth 2003;31:125-8

articles

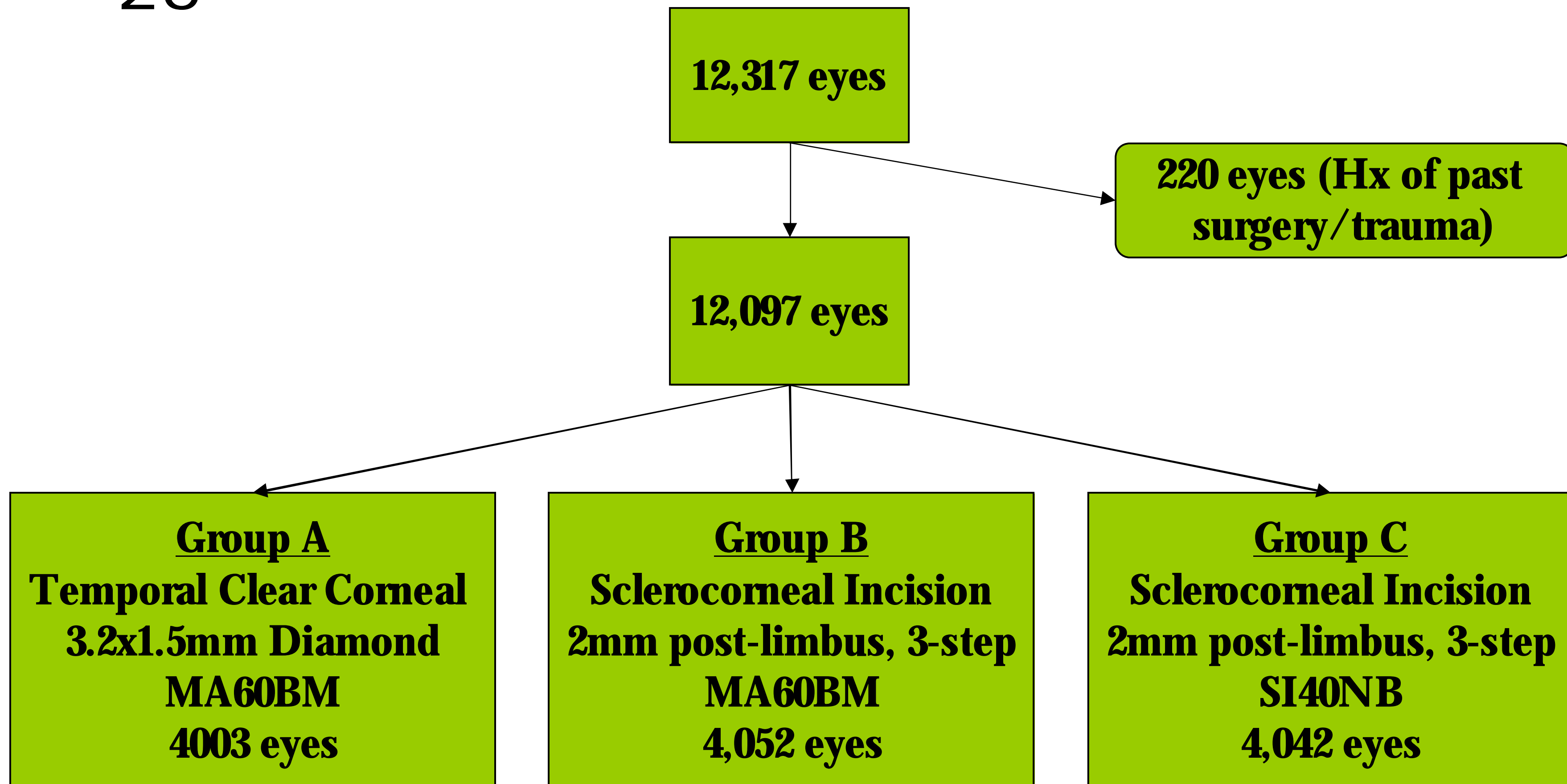
Bacterial endophthalmitis after small-incision cataract surgery

Effect of incision placement and intraocular lens type

Yasunori Nagaki, MD, Seiji Hayasaka, MD, Chiharu Kadoi, MD, Masayuki Matsumoto, MD, Shuichiro Yanagisawa, MD, Kazuhiko Watanabe, MD, Konomi Watanabe, MD, Yoriko Hayasaka, MD, Naoko Ikeda, MD, Shoichi Sato, MD, Yasushi Kataoka, MD, Mika Togashi, MD, Tomohiro Abe, MD

6. Wound Site or IOLs?

- Nagaki Y et al JCRS January 2003; 29:20-26



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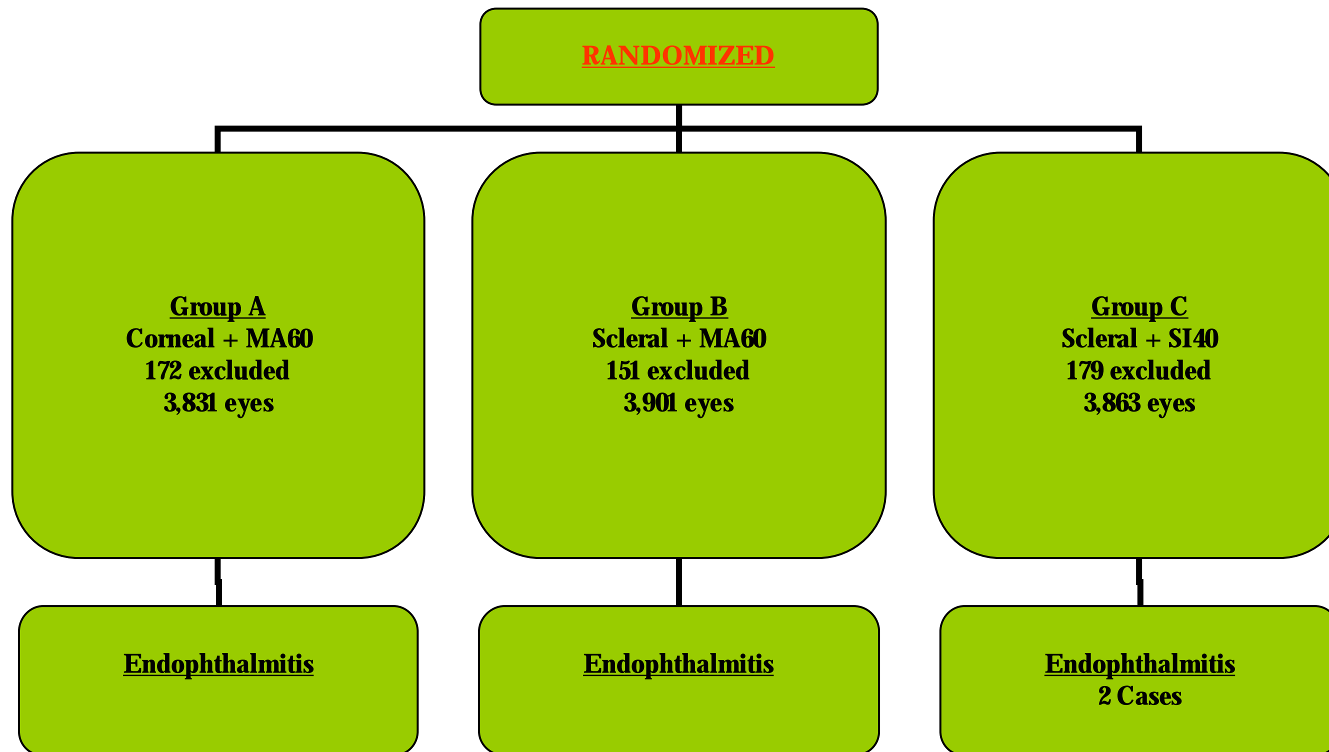
Exclusion Criteria: PC Tear, Wound >3.5mm, Suture, LTFU



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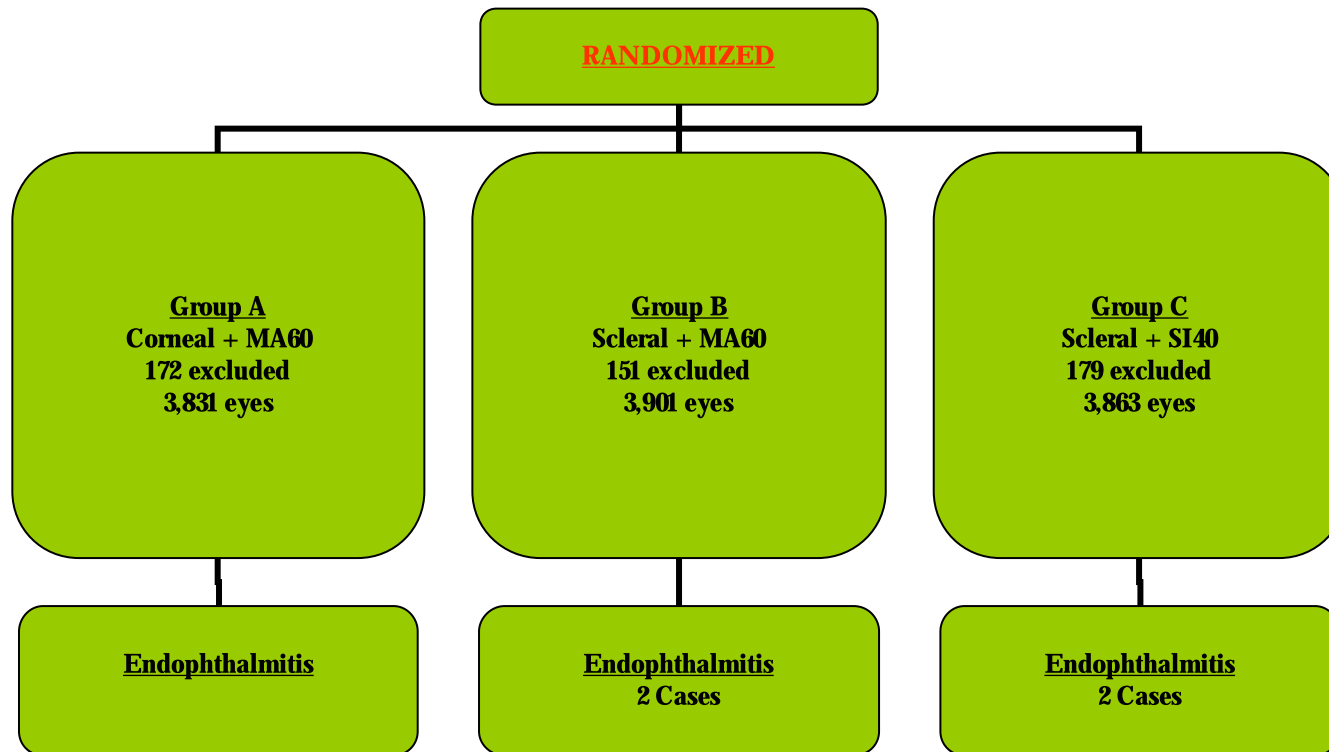

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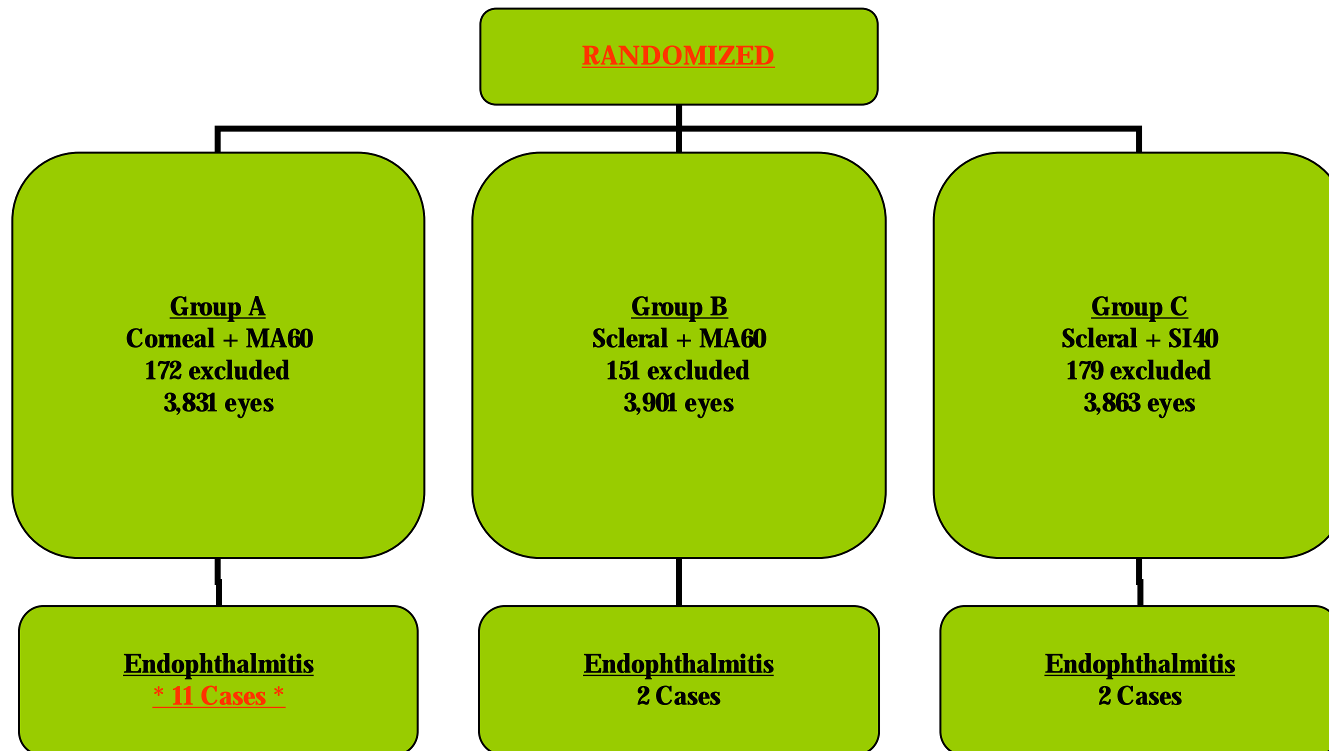
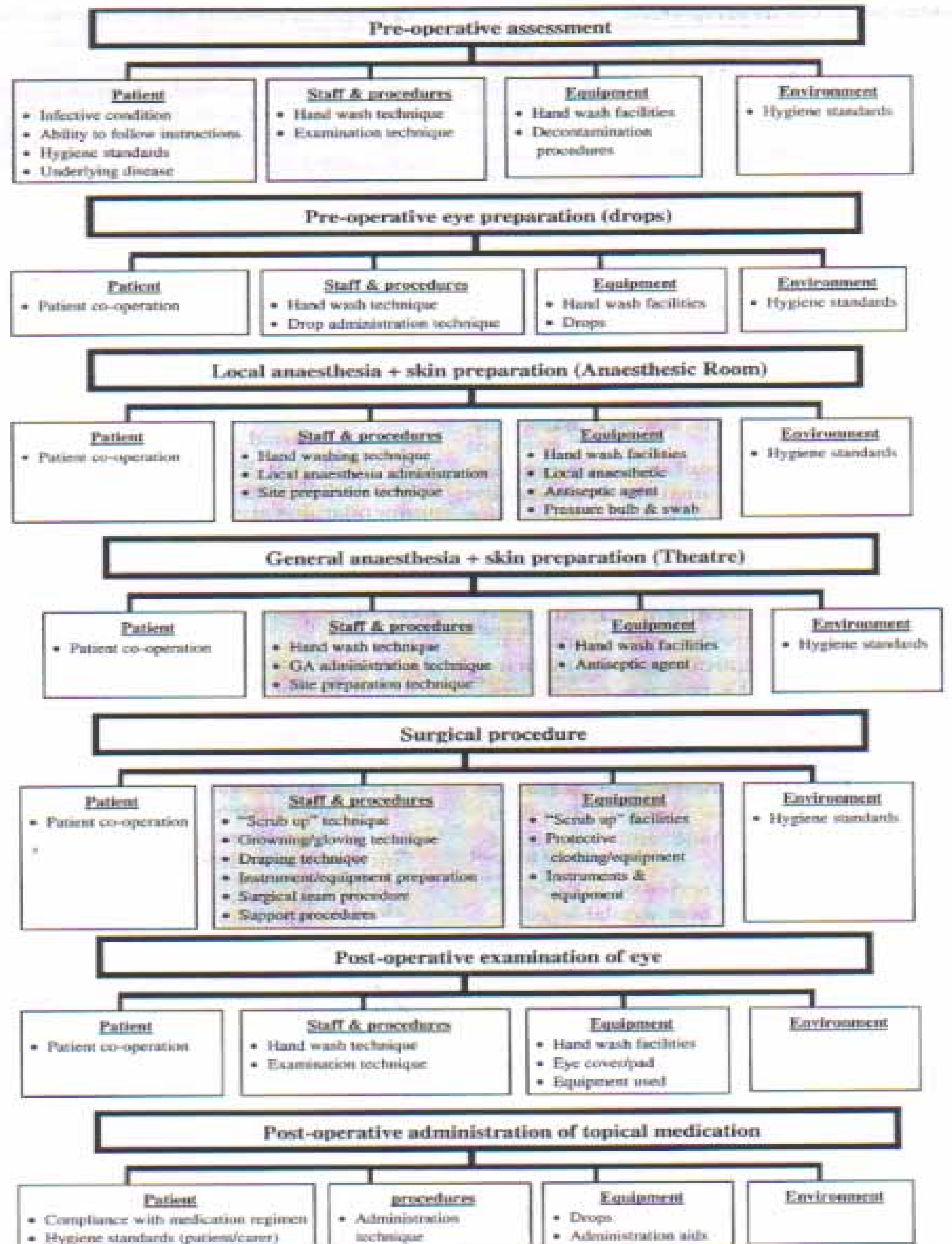


6. Wound Site or IOLs?

- 5 fold increased risk of endophthalmitis ($p=0.037$) with temporal clear corneal wound
- IOL no effect (ESCR trial silicone worse)
- Second Largest Randomised trial of endophthalmitis prophylaxis is challenging accepted technique
- Visual recovery high: 12 of 15 eyes 6/12 or better
  - Group A: LP and 6/120 and Group B: 6/120

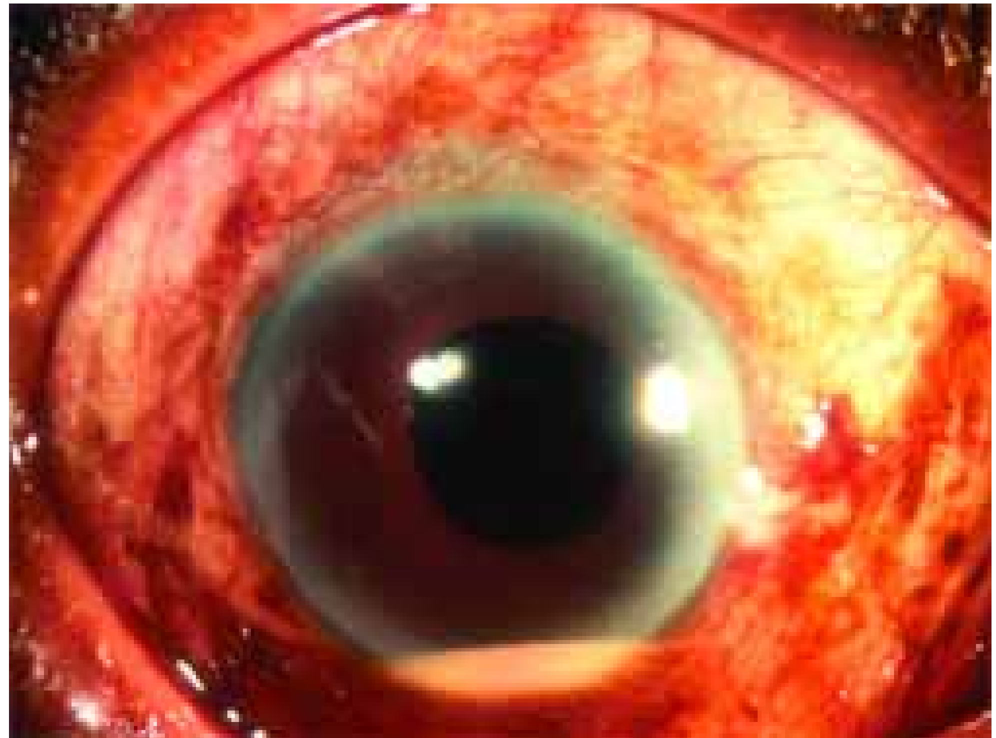
Individual Response

- Revert to sclerocorneal wound
- Change to superior or superotemporal location
- Better construction: 3.2x3.2mm cadaver
- Suture or Injecting IOLs
- Avoid hypotony post-op
- Role of pad, shield, eye rubbing uncertain
- Consider antibiotic cover: subconjunctival, intracameral


Pre-operative assessment
Patient
Infective condition
Ability to follow instructions
Hygiene standards
Underlying disease
Staff & procedures
Hand wash technique
Examination technique
Equipment
Hand wash facilities
Decontamination procedures
Environment
Hygiene standards
Pre-operative eye preparation (drops)
Patient
Patient co-operation
Staff & procedures
Hand wash technique
Drop administration technique
Equipment
Hand wash facilities
Drops
Environment
Hygiene standards
Local anaesthesia + skin preparation (Anaesthesic Room)
Patient
Patient co-operation
Staff & procedures
Hand washing technique
Local anaesthesia administration
Site preparation technique
Equipment
Hand wash facilities
Local anaesthetic
Antiseptic agent
Pressure bulb & swab
Environment
Hygiene standards
General anaesthesia + skin preparation (Theatre)
Patient
Patient co-operation
Staff & procedures
Hand wash technique
GA administration technique
Site preparation technique
Equipment
Hand wash facilities
Antiseptic agent
Environment
Hygiene standards
Surgical procedure
Patient
Patient co-operation
Staff & procedures
"Scrub up" technique
Growning/gloving technique
Draping technique
Instrument/equipment preparation
Surgical team procedure
Support procedures
Equipment
"Scrub up" facilities
Protective clothing/equipment
Instruments & equipment
Environment
Hygiene standards
Post-operative examination of eye
Patient
Patient co-operation
Staff & procedures
Hand wash technique
Examination technique
Equipment
Hand wash facilities
Eye cover/pad
Equipment used
Environment
Post-operative administration of topical medication
Patient
Compliance with medication regimen
Hygiene standards (patient/carer)
procedures
Administration technique
Equipment
Drops
Administration aids
Environment

Not all endophthalmitis is infective

- Some cases are due to toxicity
- Well known with triamcinalone
- Clusters of endophthalmitis analysed
  - Viscoelastic
  - IOLs
  - SSU washing solution



Recommendations

- Treat pre-existing eye + systemic disease
- Surgical theatre with strict infection control and well trained meticulous scrub nurses
- Betadine proven: slap it on!
- Meticulous draping and surgical technique
  - Avoid PC tears (4.5 X risk)
  - Temporal clear corneal (5 X risk)
  - Subconj or Intracameral antibiotics essential
- Post-op antibiotic regime

Recommendations

- Educate patients
  - RSVP
    - Redness
    - Sensitivity to light
    - Vision reduction
    - Pain
    - Must seek immediate help
    - Surgeons mobile, Sydney Eye Hospital
    - Quicker managed the better the Vision!

Conclusion

- Endophthalmitis can be prevented and rate reduced to very low levels!
- Responsibility of all surgical staff to ensure risk minimised
- Prophylaxis is critical
- Further large trials are needed
- Each surgical team needs to have an up to date regime guided by the literature and experience
- "Prevention is better than cure"

Thanks