Surgical Therapy in Glaucoma 2012

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Trends

• Streamlining of existing procedures
  – Express Minishunt
  – Use of Fibrin glue to reduce suturing
  – Alternative tube placement techniques
• Less invasive procedures
  – Canaloplasty
  – Trabectome
  – Gold Shunt
  – Glaukos shunt
  – ECP

Considerations

• Impact of subsequent or prior procedures
• Realistic expectations on intraocular pressure control and continuing medical therapy
• Expected and tolerable side effects and complications

Glaucoma Procedure Options that we have done

Trabeculectomy with Express Minishunt

Express Minishunt Advantages

• Reduces operating time
• Eyes appear to be quieter earlier in post-op course
• No iridectomy
• Uniform opening
• If hypotony occurs, tends to be less severe
Express Minishunt Disadvantages

• Needs some suturing as in trabeculectomy
• Dependent on patient healing
• Anti-metabolites still routinely used
• Patient has bleb
• Hypotony possible

Reasons to use the Express

• Simplify procedure
• Shorten surgery time
• Decrease tissue manipulation
• Eliminate need for iridectomy
• Decrease chance of ostium obstruction
• Regulate flow in short term
• Create less short term inflammation

Arguments Against

• Expense
• Foreign body
• Metal in eye
• Corneal contact

Patient Selection

• Same as trabeculectomy
• May work better in high risk patients
• ICE patients
• NV patients
• Shallow/synechiae

Resident Surgery with Ex-PRESS

• No difference
  – postoperative IOP
  – proportional decrease in IOP
• Ex-PRESS group
  – Significantly less medication to control IOP at 3 months
  – No difference at 6 months or 1 year (P=0.28)
  – More Ex-PRESS patients had good IOP control without meds at 3 (P=0.057) and 6 months (P=0.076)
  – No difference was found in the rates of sight-threatening complications (P=0.22)

Retrospective Case Series

• Final percent IOP lowering was similar
• Moorfields Bleb Grading System
  – Less vascularity and height but more diffuse area associated with the Ex-PRESS blebs
• Fewer cases of early postoperative hypotony and hyphema
• Quicker visual recovery
  – The Ex-PRESS group required fewer postoperative visits compared with the trabeculectomy group (P < .000).

Ex-PRESS in prior operated eyes

- Success complete in 60 (60%) and qualified in 24 (24%) eyes
- Mean IOP
  - 27.7 ± 9.2 mm Hg with 2.73 ± 1.1
  - 14.02 ± 5.1 mm Hg with 0.72 ± 1.06 drugs (p < 0.0001)
- Failure
  - Uncontrolled IOP (11%)
  - bleb needling (4%)
  - persistent hypotony (1%)


5 year study Ex-press vs Trabeculectomy

- EX-PRESS more effective without medication
  - At year 1 12.8% of patients required IOP meds after EX-PRESS implantation vs 35.9% after trabeculectomy
  - At year 5 (41% versus 53.9%)
- Responder rate was higher with EX-PRESS
- Time to failure was longer
- Surgical interventions for complications were fewer after EX-PRESS implantation

Results

• The mean preoperative IOP was 23.7 ± 9.3 and the mean postoperative IOP on the last follow up day was 10.4 ± 4.5 (p<0.001) over a mean follow up period of 199 days (range 29-608).
• The mean number of medications used preoperatively was 2.83 ± 1.1 and postoperatively was 0.023 ± 0.1 (p<0.001).
• Complications as hypotony, bleb leak, choroidal detachment, and transient hyphema were detected.

Outcomes

• Studies overall suggest compared to trabeculectomy-
  – Less severe hypotony
  – Less bleeding
  – Less inflammation
  – Faster visual recovery
  – Similar long term IOP control

Baerveldt

• Effective for almost all types of glaucoma
• Able to do when other procedures are not possible
• Not dependent on patient healing
• Can implant multiple devices
Baerveldt Disadvantages

- Invasive - extensive dissection
- Large foreign object
- Diplopia possible
- Need some conjunctiva
- Very low pressures difficult to achieve

ECP

ECP Advantages

- Quick procedure, especially in cataract setting
- Titratable
- Can be done with outflow procedures
- Hypotony unlikely

ECP Disadvantages

- Some learning curve to avoid complications
- Inflammation possible
- IOP does not decrease rapidly
- Difficult to do in some eyes

Canaloplasty

Effects of Suture Tension

Ex-Vivo Perfusion Study, Utilizing Morton Grant Flow Model

- Pressurize globe to a range of physiologic pressures
- Apply tension to a suture implanted through the canal
- Measure outflow facility (uL/Min/mmHg)
Canaloplasty

Canaloplasty Advantages
- Non-invasive
- No destruction of anatomy
- Hypotony unlikely
- Rapid recovery
- High Safety Profile

Canaloplasty Disadvantages
- Longer operating times
- Learning curve
- Sometimes cannot cannulate
- Extensive prior scarring may eliminate possibility of performing procedure

Trabectome

Trabectome Advantages
- Quick procedure
- Hypotony unlikely
- Ab interno approach eliminates dependence on dissection
- Can do in many types of glaucoma

Trabectome Disadvantages
- Need to be able to visualize angle
- Bleeding common
- Very low IOPs unlikely
- Cannot do in eyes with canaloplasty
Gold Shunt

Gold Shunt Advantages
• Straightforward procedure
• Suprachoroidal space attractive to work in
• No bleb
• Hypotony unlikely

Gold Shunt Disadvantages
• Still in evolution
• Very low IOPs are not possible
• Device is fragile
• Titrability not proven in humans

iStent (Glaukos)

Why Trabecular Bypass Surgery?
Stent / Efficacy:
• Schlemm’s canal is part of the aqueous outflow pathway
• iStent restores aqueous outflow chain by bypassing only the blockage that occurs with glaucoma in the trabecular meshwork
• IOP reductions to mid teens
Glaukos Efficacy

![Graph showing IOP measurements over time]

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Glaukos Advantages

- Quick to perform
- No dependence on prior procedures
- May be able to titrate with multiple procedures

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Glaukos Disadvantages

- Very low IOPs not likely
- Need open angle
- Placement of earlier device is sometimes difficult

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Glaucoma Surgical Procedures

- Many evolving and new procedures
- Surgeon has more options at his disposal than ever before
- Customization can be done to balance risk and reward for each individual patient

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