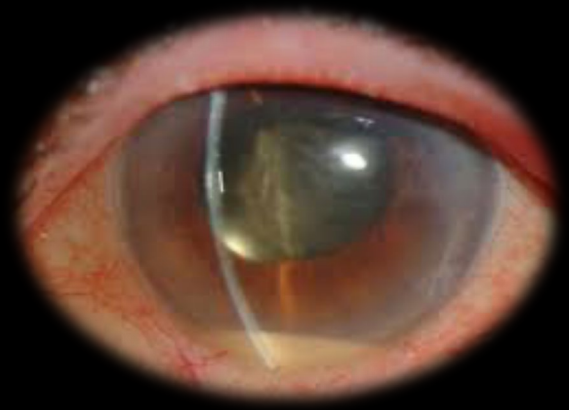
Intravitreal injections and endophthalmitis:

Does lidocaine gel change the risk of the infection?



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My role in this research involves:

- Conception and design of the project

- Acquisition of data

- Analysis and interpretation of data

- Creation and critical review of the presentation

Lidocaine gel may or may not influence the risk of post-injection endophthalmitis.

- Lad *et al*:

	Cases	Injections	Endophthalmitis proportion
Lidocaine	4	4,120	0.097%
No Lidocaine	4	4,682	0.085%
Total	8	8,802	0.091%

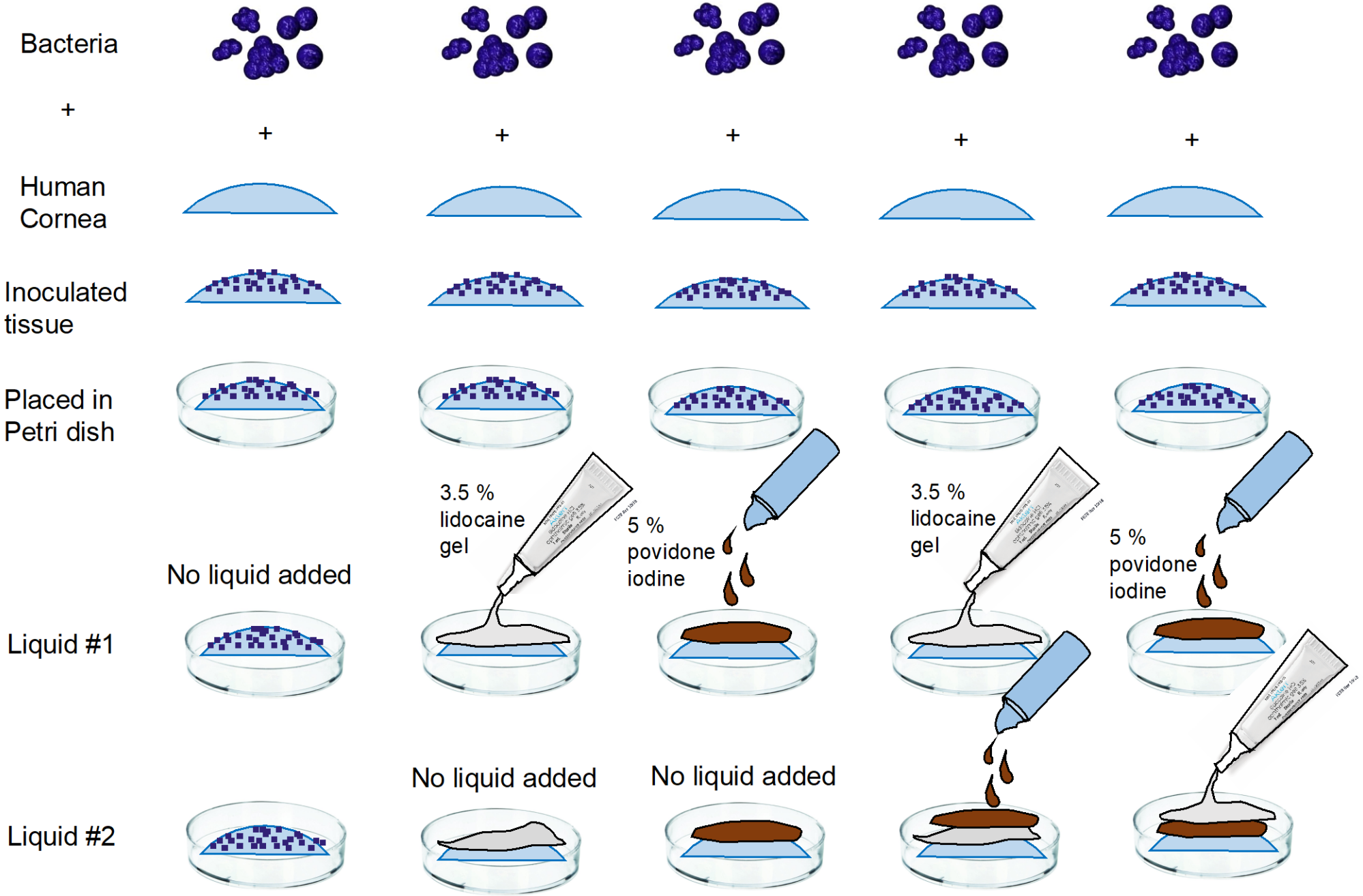
- Stem *et al*:
  - 58 endophthalmitis cases out of 154,198 injections were analyzed.
  - Use of 2% lidocaine (Xylocaine) or 0.5% tetracaine HCL (Tetravisc) increased the rate 4 to 10-fold after adjusting for other variables.
  - The sequence of lidocaine and povidone-iodine placement was not evaluated.

Research questions

- Does lidocaine increase the risk of infection?
- If so, by what mechanism? Does lidocaine promote bacterial growth, or provide protection against exposure to povidone-iodine?
- Does the risk of infection change based on endophthalmitis isolate?

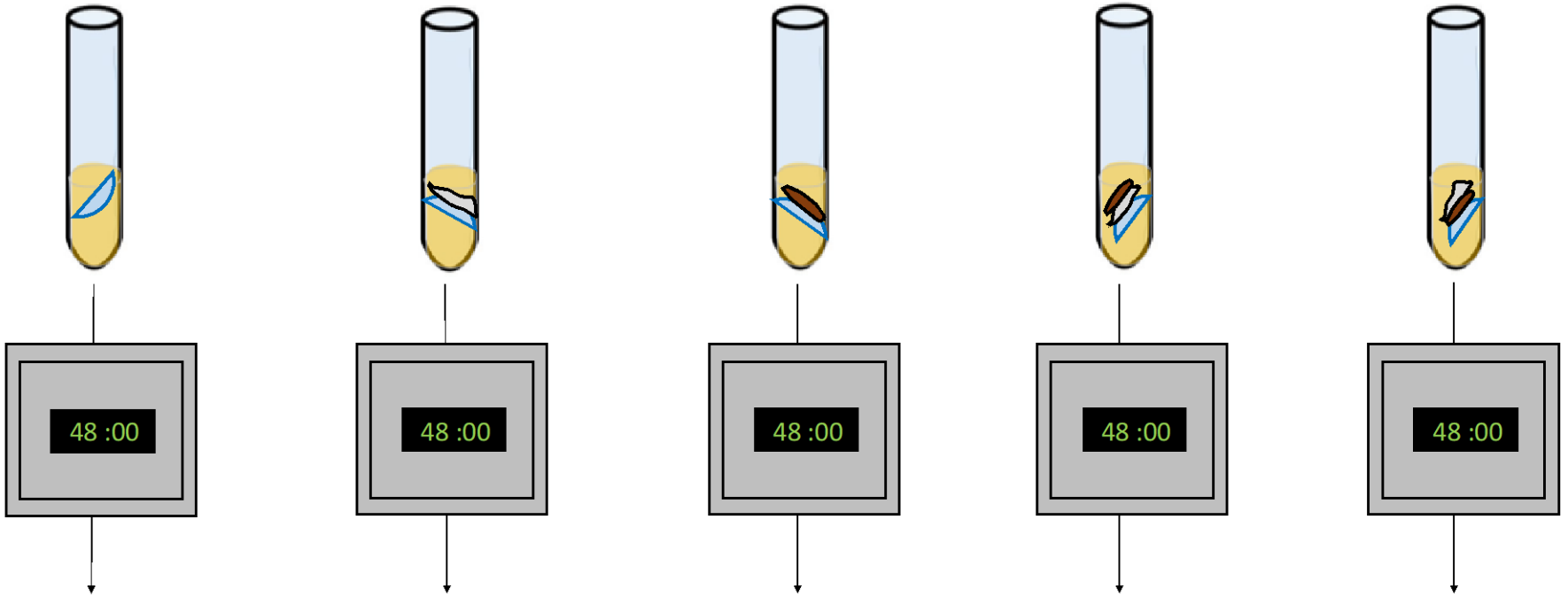
Methods

- 5 bacteria isolates from prior cases of eyes with endophthalmitis were tested:
  - beta hemolytic Streptococcus
  - Staphylococcus epidermidis
  - Streptococcus viridans
  - Enterococcus
  - Staphylococcus aureus
- We uniquely use human corneal tissue to resemble in vivo growth of bacteria.
- Corneal rims were used to test the interactions of 3.5 % lidocaine gel (Akten) and 5% povidone iodine.


Bacteria
+
Human Cornea
Inoculated tissue
Placed in Petri dish
Liquid #1
Liquid #2
No liquid added
3.5 % lidocaine gel
5 % povidone iodine
3.5 % lidocaine gel
5 % povidone iodine
No liquid added
No liquid added

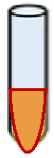
Place corneas in tube with broth

Incubate for 48 hrs

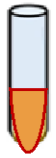


Results

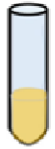
Growth



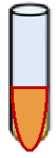
Growth



No Growth



Growth



No Growth except for Enterococcus

Growth of endophthalmitis bacterial isolates on ocular tissue exposed to sequential or solo application of application of 5% PI with or without lidocaine gel

Ocular tissue exposed to:	beta hemolytic *Streptococcus*	*S. epidermidis*	*S. viridans*	*Enterococcus*	*S. aureus*
Bacteria alone	+	+	+	+	+
Lidocaine only	+	+	+	+	+
PI only	-	-	-	-	-
Lidocaine then PI	+	+	+	+	+
PI then lidocaine	-	-	-	+	-

(+) equals growth at 48 hours;
(-) equals no growth at 48 hours;
PI = povidone iodine;
3% lidocaine gel (Akten) was used.

Conclusions

- Lidocaine gel may promote endophthalmitis by acting as a physical barrier – protecting bacteria from povidone-iodine.
- For Enterococcus, lidocaine gel may act as growth media, dilute povidone iodine, or prevent freeing of iodine (Berkelman 1982).
- Local anesthetics can have significant bactericidal properties; however, lidocaine gel was an ineffective disinfectant at 3.5 %.
  - Studies on oral biofilms found 2.5 % lidocaine gel ineffective (Gocmen 2009).

Conclusions

Povidone iodine and then lidocaine gel is the best sequence to prevent endophthalmitis during intravitreal injections.

Avoiding lidocaine gel use is likely the safest option.

Acknowledgements

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References

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5. Google images

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