Clinical and histological morphology of posterior capsule plaques in congenital cataract

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The authors declare no financial interest

Purpose:

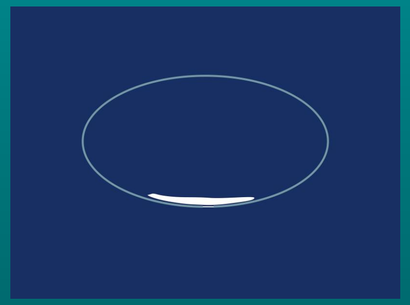
1. To classify posterior capsule plaques found in children with congenital cataract based on their clinical and histological morphology.

2. To assess their relevance to persistent fetal vasculature.

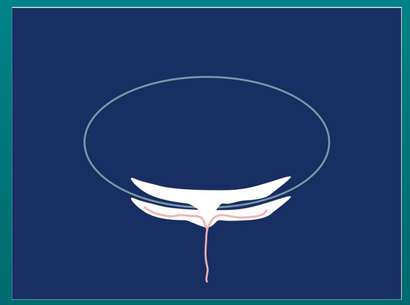
Methods:

set of 30 eyes of 29 patients who underwent surgery for congenital cataract, age during surgery from 4 weeks to 10 months

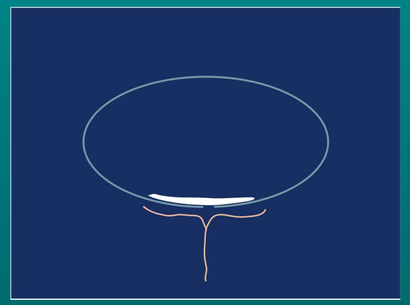
sampling plaques from posterior capsule with or without persistent posterior tunic with attached hyaloid artery during surgery



plaque on posterior capsule



persistent posterior tunic



hyaloid artery

Methods:

- based on clinical morphology the samples were divided into four groups depending on whether the plaques could or could not have been separated from posterior capsule and whether there were any distinctive signs of persistent fetal vasculature

- histological processing of samples using basic and selective staining techniques: collagen type II (contained in vitreous, never inside lens), collagen type IV (contained in lens, never in vitreous), vimentin (tissues of mezenchymal origin), CD68 (macrophages), CD31 (endothelial cells), SMA -smooth muscle actin (myofibroblasts), cytokeratin AE1/AE3 (tissues that do not originate in lens), CD79a (B- lymfocytes), CD3 (T-lymfocytes)

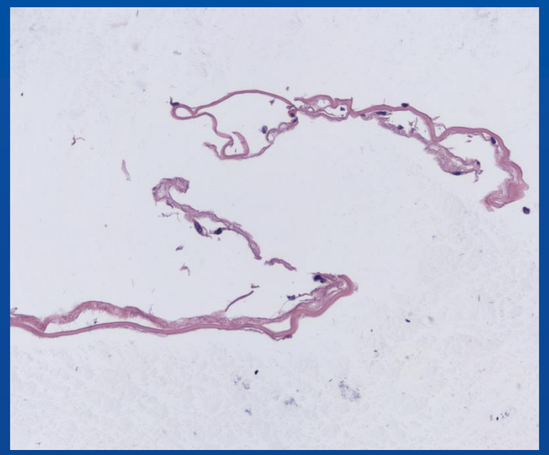
Results:

plaques separable from posterior capsule

- **without signs of persistent fetal vasculature**
  4 eyes of 4 patients

typical clinical finding in this group

- histological finding: in all patients small amount of cellular tissue, in one patient negative CD31 staining, not done in other patient



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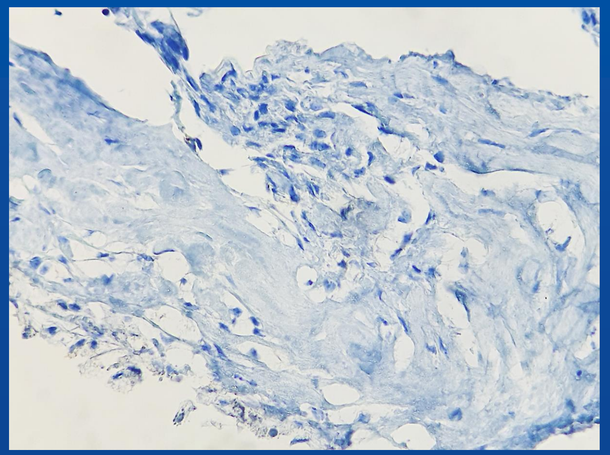
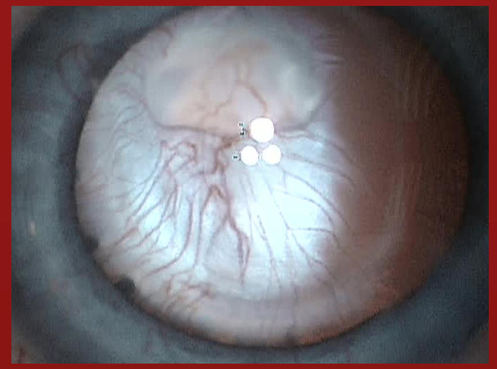


CD31

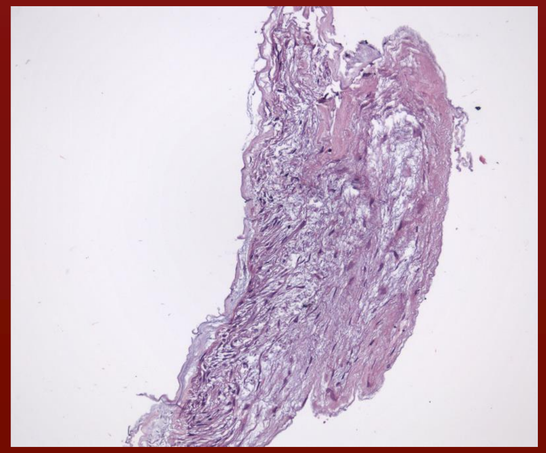
plaques separable from posterior capsule

- **with signs of persistent fetal vasculature**
  5 eyes of 5 patients



typical clinical finding in this group

- histological finding: in all patients abundantly cellular tissue, CD31 positive in 4 patients, not done in one patient, vasculature in 3 patients



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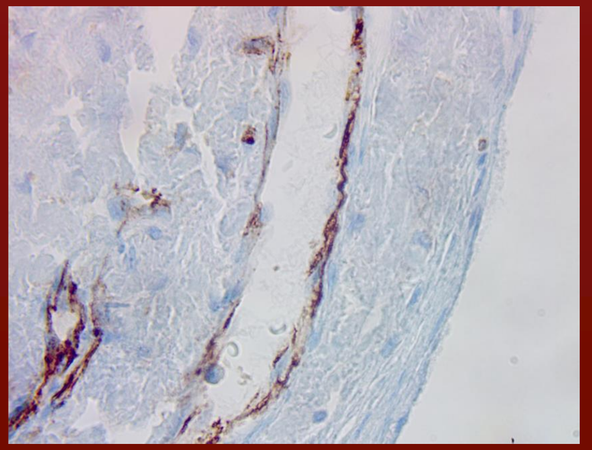
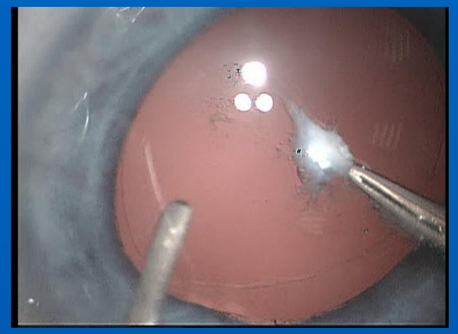


CD31

Results:

plaques separable from posterior capsule
- **without signs of persistent fetal vasculature**
  4 eyes of 4 patients



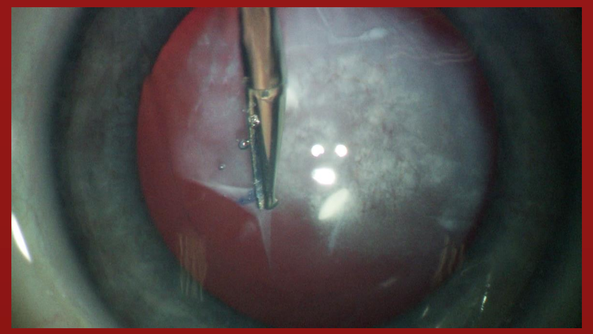
typical clinical finding in this group

- histological finding: in all patients capsule positive for collagen IV staining, in two patients adhering to capsule membrane positive for collagen II staining

collagen II

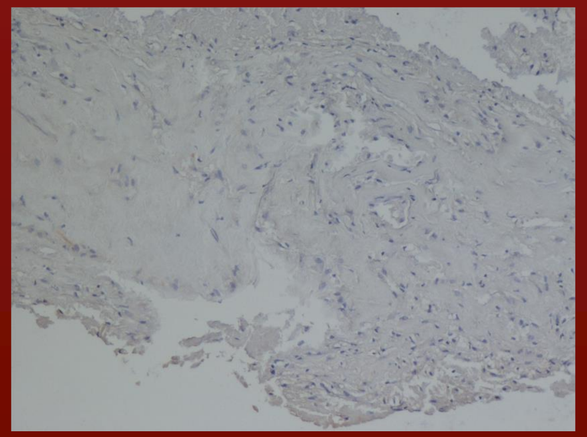
collagen IV

plaques separable from posterior capsule
- **with signs of persistent fetal vasculature**
  5 eyes of 5 patients

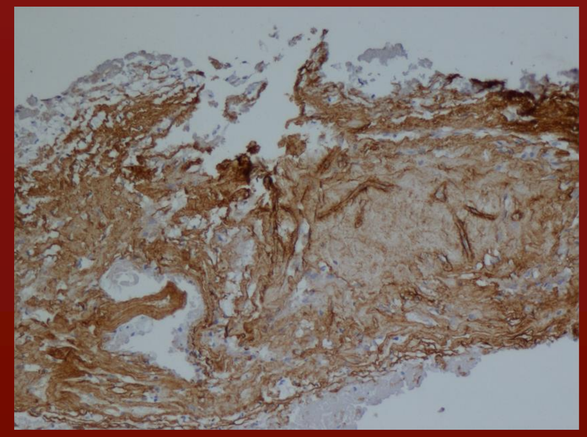


typical clinical finding in this group

- histological finding: capsule positive for collagen IV staining in 3 patients, in one capsule splitting into several membranes, in 2 patients adhering to capsule membrane positive for collagen II staining



collagen II



collagen IV

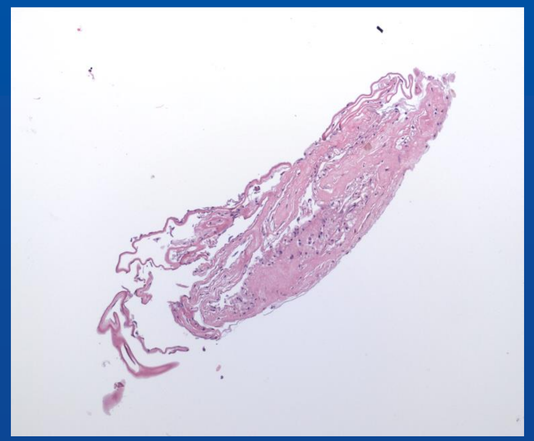
Results:

plaques not separable from posterior capsule

- **without signs of persistent fetal vasculature**
  11 eyes of 10 patients

typical clinical finding in this group

- histological finding: in all patients cellular tissue, in two patients with vasculature, CD31 staining done in one patient- negative



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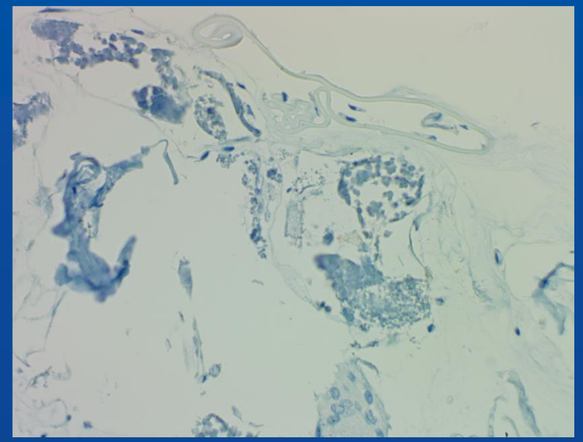
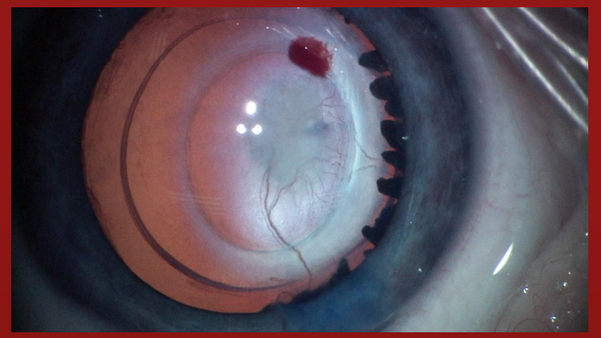


CD31

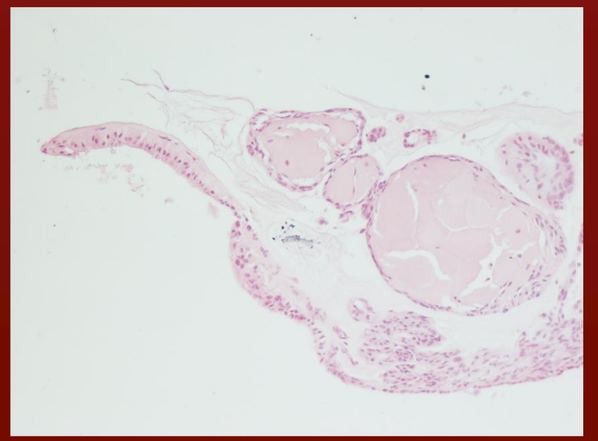
plaques not separable from posterior capsule

- **with signs of persistent fetal vasculature**
  10 eyes of 10 patients



typical clinical finding in this group

- histological finding: in all patients abundantly cellular tissue, vasculature in 6 patients, CD31 staining done in 7 patients, positive in 6 patients



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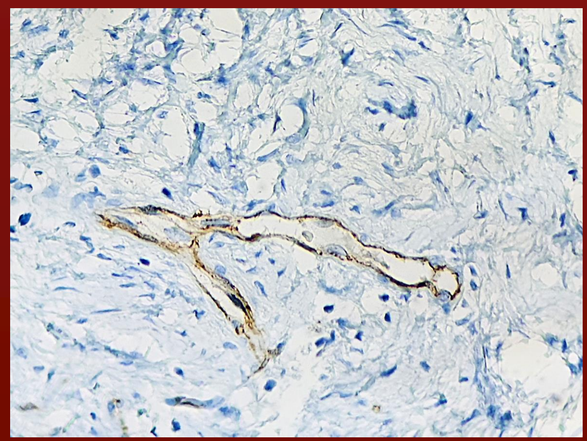

CD31

Results:

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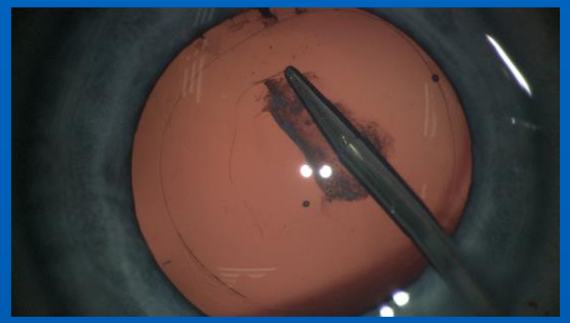
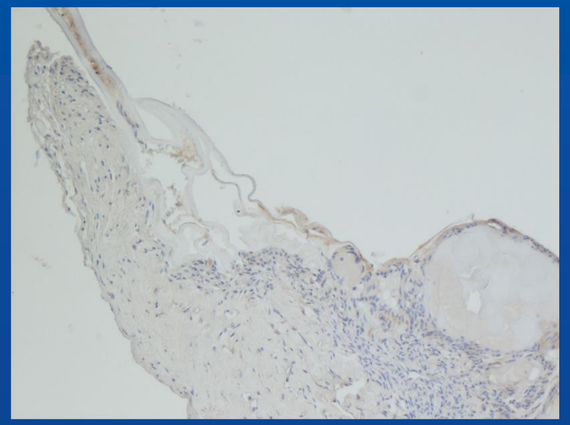
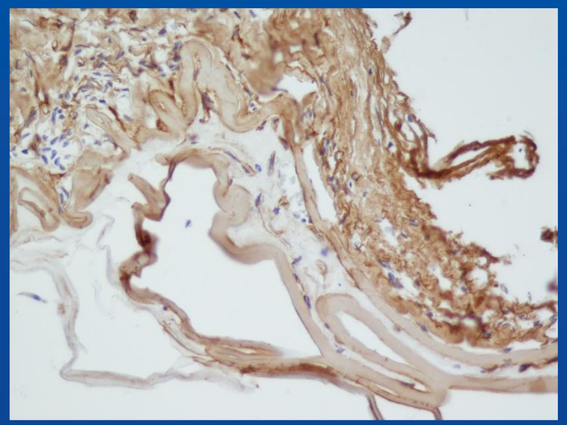


typical clinical finding in this group

- capsule positive for collagen IV staining in all patients, in 7 patients splitting into several membranes, in these 7 patients membrane positive for collagen II staining adhering to capsule



collagen II

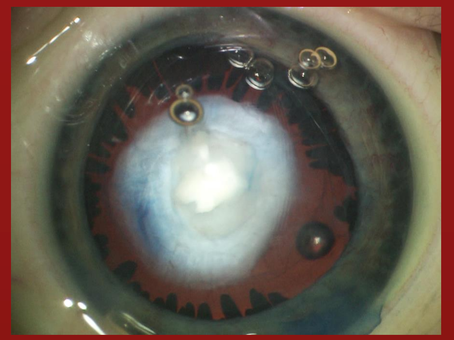


collagen IV

plaques not separable from posterior capsule

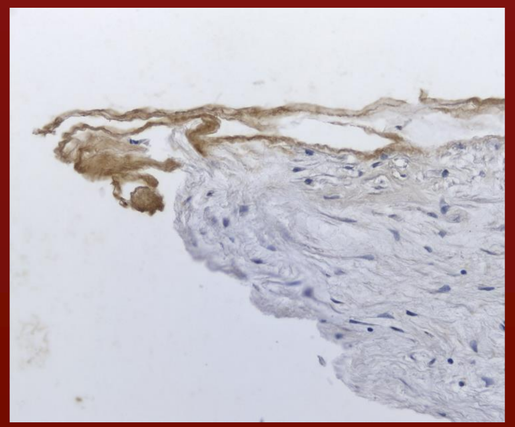
- **with signs of persistent fetal vasculature**

  10 eyes of 10 patients

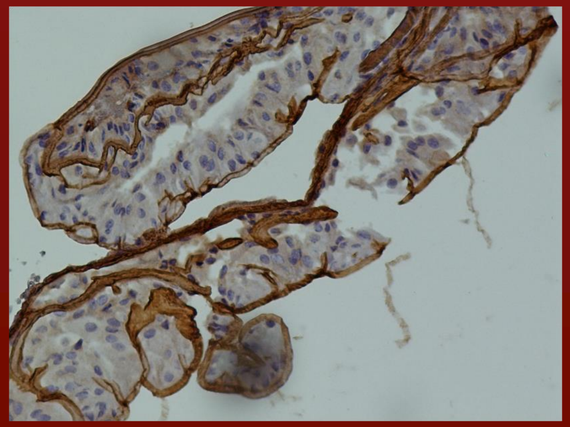


typical clinical finding in this group

- capsule positive for collagen IV staining in 8 patients, in 7 patients splitting into several membranes, in these 7 patients positive for collagen II staining



collagen II



collagen IV

Conclusion:

1. In plaques adhering to the capsule were more frequently present vascular invasion and dysgenesis of posterior capsule in form of splitting capsule.

2. The clinical and histological morphology of posterior capsule plaques in congenital cataract are similar independently on present persistent fetal vasculature.

3. The question whether the cause for fetal vasculature persisting is defective development of capsule or vice versa could not have been reliably determined based on its clinical and histological morphology.