

# Use of a Live Porcine Model to Detect Ocular Pathology by Bedside Sonography

Vincent L. Ball, MD  
Bradley N. Younggren, MD  
Stephen A. Crandall, MD

Madigan Army Medical Center

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**Objectives:** To evaluate emergency medicine (EM) residents' ability to detect ocular pathology using portable ultrasound (US) in a live porcine model.

**Methods:** This was a single-blinded outcome study to determine both the validity of a live porcine model to evaluate ocular pathology and to assess the ability of EM residents to accurately diagnose ocular pathology using handheld US. Subjects were EM residents who had undergone a two-day US course as part of their EM orientation month and had reviewed a one-hour self-instruction computer tutorial on ocular US prior to the study. Vitreous hemorrhages, retro-orbital hemorrhages and intraocular foreign bodies were simulated by placement of porcine blood and metallic objects under ultrasound guidance out of view of the subject population. Residents then performed self-directed US of two eyes each and were asked to comment on any pathology observed. Time required for each scan was noted.

**Results:** Seventy-two scans were performed to examine for vitreous hemorrhage, retro-orbital hemorrhage, and intraocular foreign bodies. EM residents were able to detect a significant abnormality greater than 93% (95CI 87-99%) of the time. Vitreous hemorrhage was the most detectable injury with over 95% (95CI 86-100%) accuracy. A significant abnormality was detected in the models with intraocular foreign bodies 97% (95CI 90-100%) of the time with a clear diagnosis of foreign body noted in 73% (95CI 57-89%) of the cases. Retro-orbital hemorrhage was the most difficult to detect with 62% (95CI 41-83%) accuracy. The average time taken for scanning two eyes was 458 sec. Central retinal artery flow was detected in 100% of the 26 cases in which this was documented. Accuracy of diagnoses was similar across levels of EM training.

**Conclusion:** EM residents can accurately diagnose significant ocular pathology using handheld US in a live porcine model. This is the first study to demonstrate the feasibility and effectiveness of such a model.