

Introduction

Healthcare technology has many emerging roles in the communication and enhancement of the delivery of healthcare. Previous studies have attempted to look at more elementary ways to improve hydrocephalus patients' health literacy, but increasingly ubiquitous access to technology warrants exploration into new ways to enhance patient understanding of this condition. Our study looks to examine the role of a novel mobile application, HydroAssist®, which is the first mobile app to allow hydrocephalus patients to record and store their hydrocephalus treatment history with easy 24/7 access on their smartphone or computer. In the study, 50 pediatric hydrocephalus patients will be recruited from Children's Hospital New Orleans, and their families will be invited to use the app for approximately six months. Upon the initiation of the study, the family's baseline knowledge of their child's hydrocephalus treatment history, including shunt type and settings, will be surveyed. After utilization of the application, a similar survey will be completed by the family at the conclusion of the study. Additional questions regarding the participant's use of the app, confidence in their knowledge of the child's condition/treatment, and if the app was able to help prevent transfer to a tertiary facility for care will be included. We hypothesize that use of the HydroAssist® mobile app will increase patients' health literacy and reduce incidence of unnecessary transfer to tertiary care facilities for treatment.

Pediatric Hydrocephalus

-1 in 770 babies will develop Hydrocephalus

-Normally approximately 150mL of cerebrospinal fluid flows through the ventricular system within the brain; this turns over 3 times per day

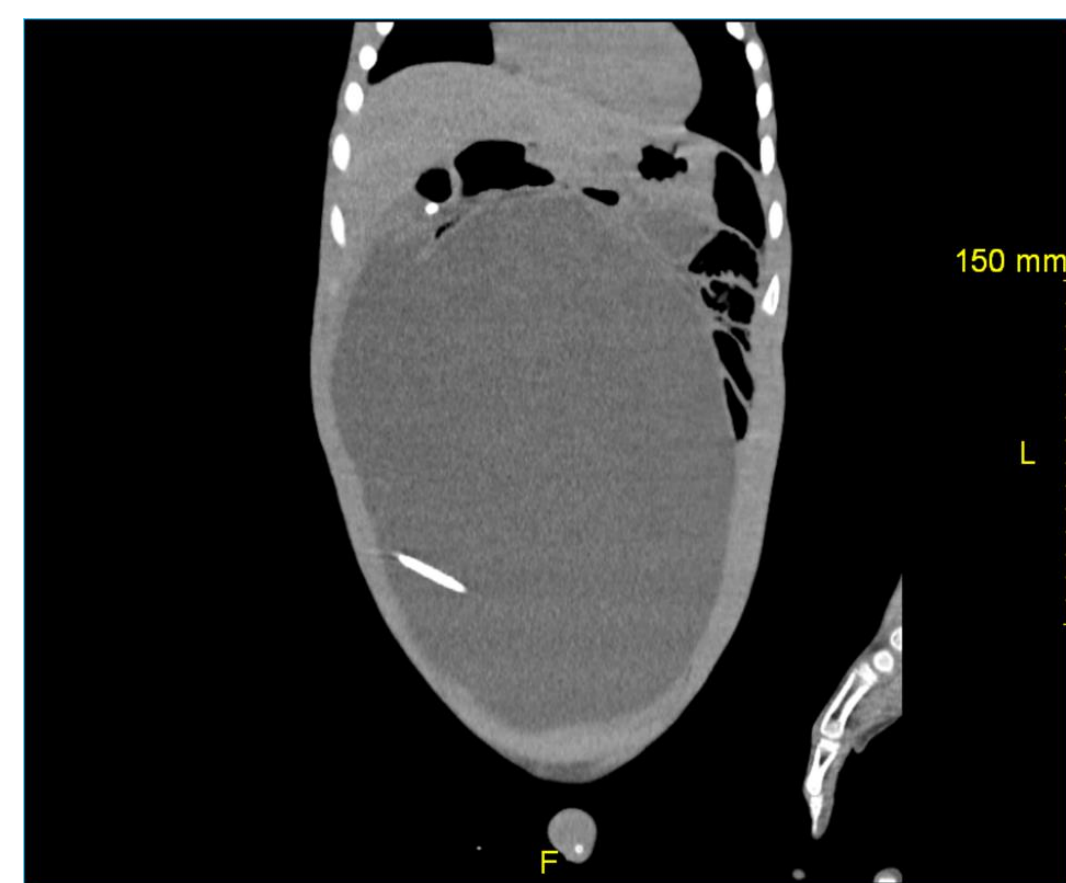
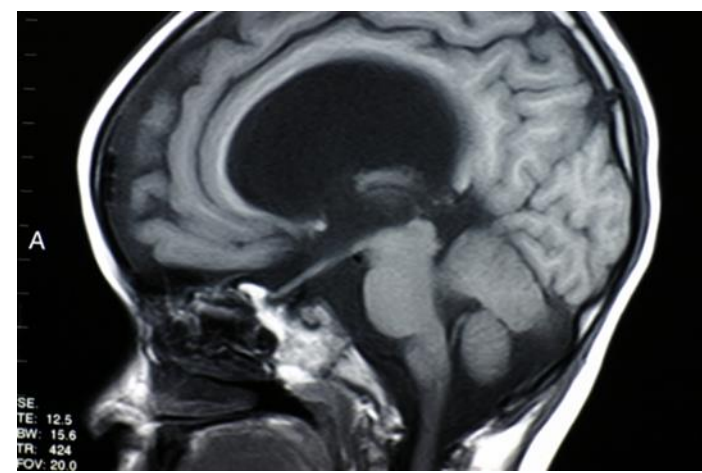
-CSF is made by Choroid Plexus within the ventricles and has no feedback mechanism to increase/decrease CSF production

-CSF build up pushes on the brain and can be life threatening if left untreated

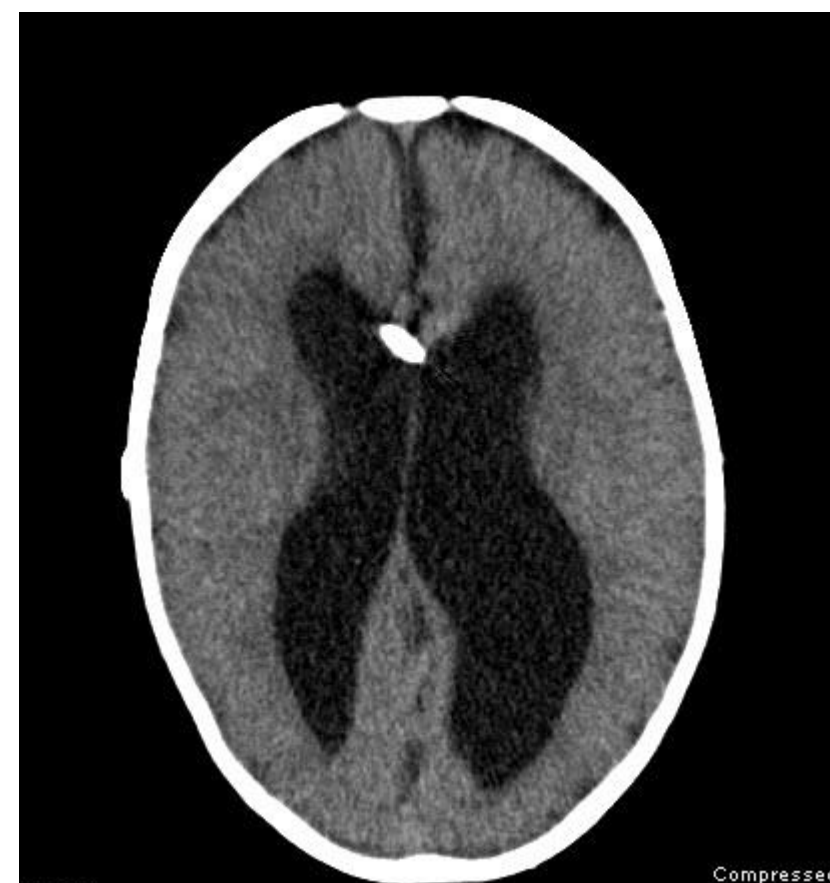
-congenital or acquired

-Circulation abnormality, resorption abnormality, CSF over production, combination

-Management can be complex, and transfers can be costly to patients and their families



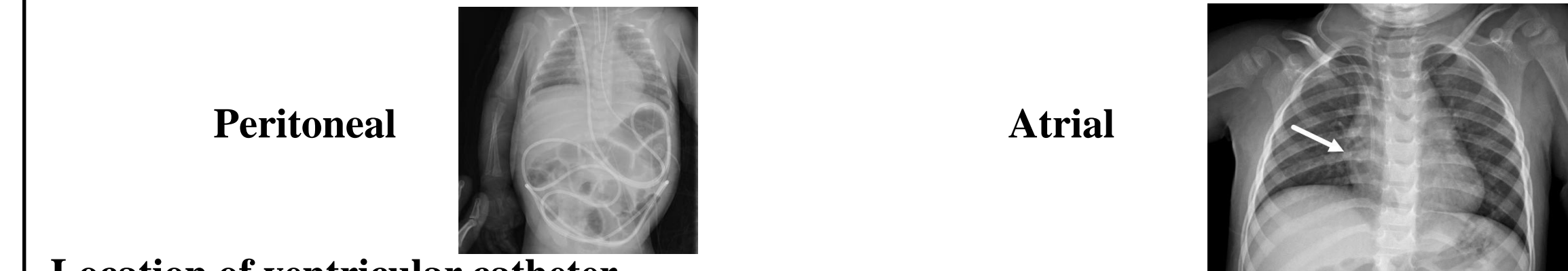
Distal Shunt Failure resulting in Pseudocyst



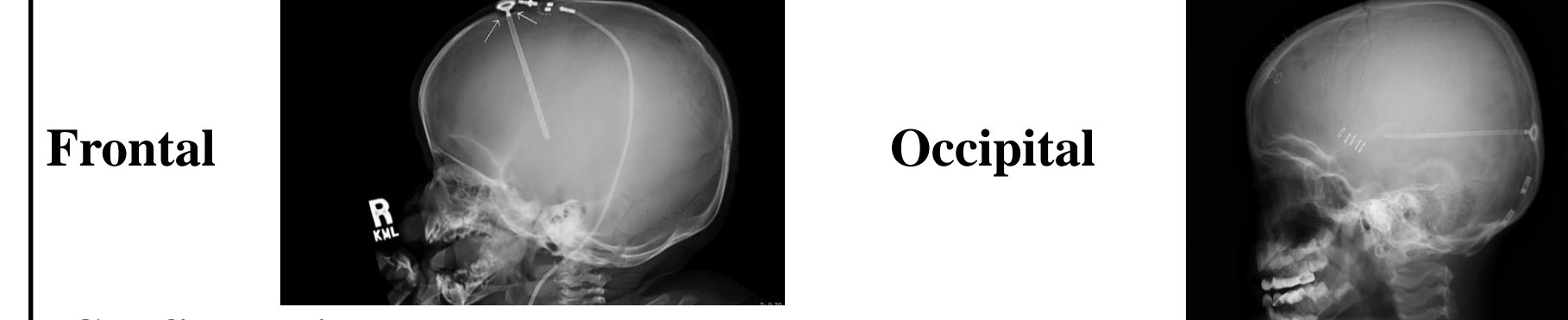
Proximal Shunt Failure

Shunt Variability

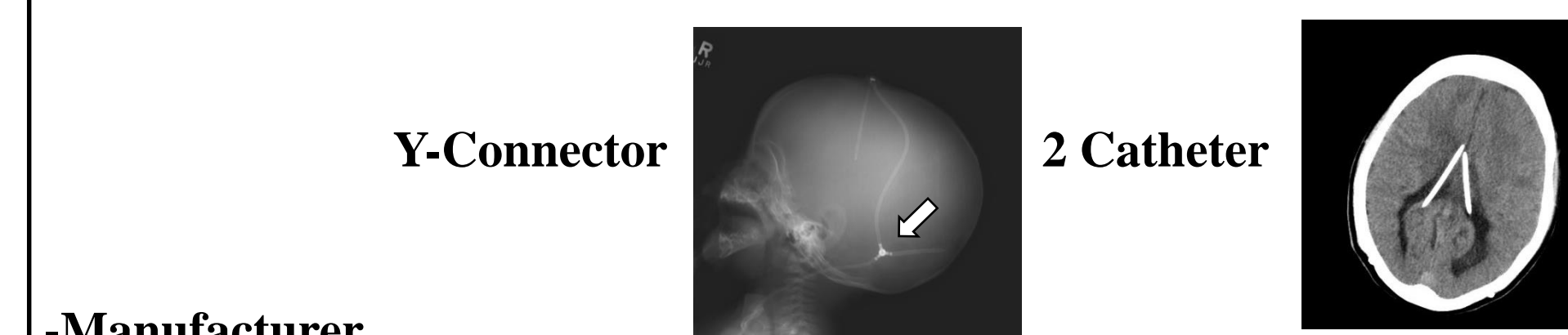
Shunts are highly variable in the following ways:
-terminus (Ventriculo- Peritoneal, Pleural, Atrial, etc)



-Location of ventricular catheter



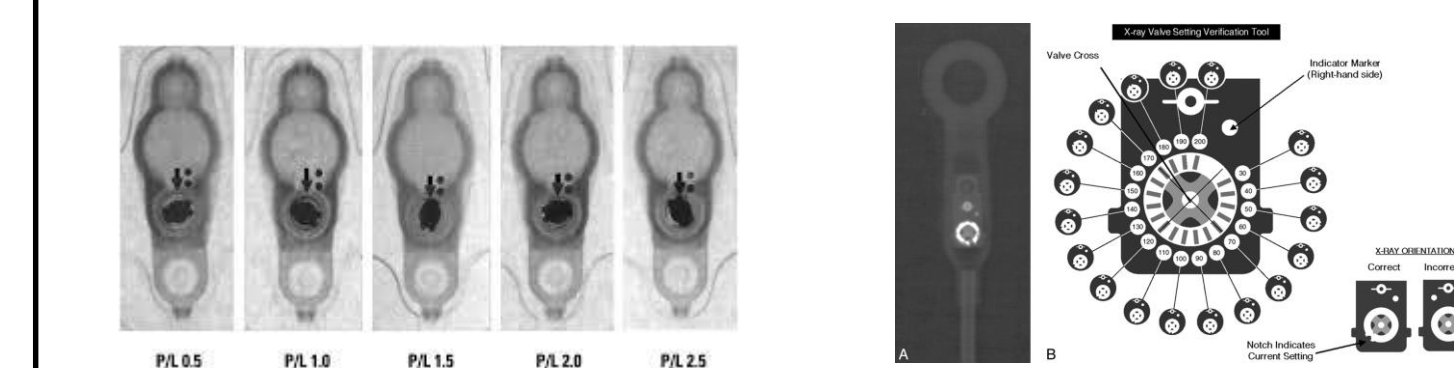
-Configuration



-Manufacturer

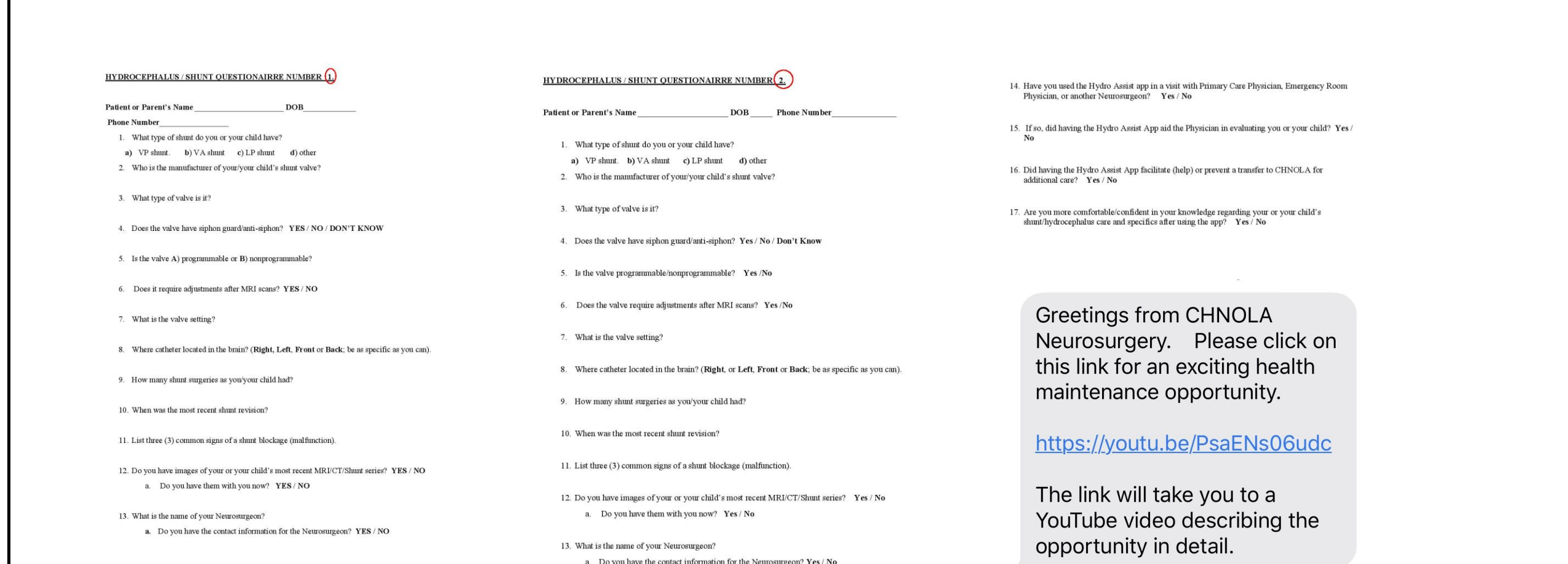


-Settings



-MRI compatibility

Patient Survey



-Initial Questionnaire (prior to app use) and Final Questionnaire (after employment of free app) completed by patient's family members to assess understanding of their child's hydrocephalus history

-Final Questionnaire also assesses usability of the app and whether or not employment of this free technology reduced rate of transfers to tertiary care facilities

-Study recruitment occurs in person at CHNOLA or via text message with link to instructional YouTube video

Conclusions

Our project remains in the recruitment phase of the study. At this point, we have made contact with 35 patients (a mixture of inpatients and outpatients) of the 50 needed for projected statistical significance. Although we hoped to recruit more patients during the summer research experience, the Covid-19 pandemic and difficulty obtaining EMR access in a timely fashion made this challenging. The final questionnaire has not yet been administered in these patients and will be done in approximately 6 months; therefore, preliminary data cannot be reported at this time.

References

Lollis SS, Mamourian AC, Vaccaro TJ, Duhaime A-C. Programmable CSF Shunt Valves: Radiographic Identification and Interpretation. American Journal of Neuroradiology. 2010;31(7):1343-6.

Moghekar, Abhay. "HydroAssist® Mobile Application." Hydrocephalus Association, 10 Dec. 2019, www.hydroassoc.org/hydroassist-mobile-application/.

HydroAssist®

HydroAssist® is a free mobile application developed by the Hydrocephalus Association and is available for iPhone and Android. It allows Hydrocephalus patients and their families to:

- Enter and store current/past Hydrocephalus treatments
- Store MRI, CT, or other imaging
- Store medical and emergency contacts for the patient
- Record and store shunt type, setting, and position
- Access any of this information on mobile phone or computer

