Fetal aqueductal stenosis

Fetal aqueductal stenosis (AS) is one of the most common causes of congenital hydrocephalus, which increases intracranial pressure due to partial or complete obstruction of cerebrospinal fluid flow within the ventricular system. Approximately 2-4 infants per 10,000 births develop AS, which leads to progressive hydrocephalus, which enlarges the head often necessitating delivery by caesarean section. Most babies born with AS are severely neurologically impaired and experience a lifetime of disability. Therefore, a new device technology for ventriculo-amniotic shunting is urgently needed and has been studied to ameliorate or prevent fetal hydrocephalus development, which can provide a significant impact on patients and their family's quality of life and on the decrease of the healthcare dollars spent for the treatment. This study has successfully validated the design of shunt devices and demonstrated the mechanical performance and valve functions. A functional prototype shunt has been fabricated and subsequently used in multiple in vitro tests to demonstrate the performance of this newly developed ventriculoamniotic shunt. The shunt contains a main silicone-nitinol composite tube, a superelastic 90° angled dual dumbbell anchor, and an ePTFE valve encased by a stainlesssteel cage. The anchor will change its diameter from 1.15 mm (collapsed state) to 2.75 mm (deployed state) showing up to 1.4-fold diameter change in human body temperature. Flow rates in shunts were quantified to demonstrate the valve function in low flow rates mimicking the fetal hydrocephalus condition showing "no backflow" for the valved shunt while there is up to 15 mL/h flow through the shunt with pressure difference of 20 Pa. In vivo ovine study results show the initial successful device delivery and flow drainage with sheep model ¹⁾

1)

Emery SP, Greene S, Elsisy M, Chung K, Ye SH, Kim S, Wagner WR, Hazen N, Chun Y. In vitro and in vivo assessment of a novel ultra-flexible ventriculoamniotic shunt for treating fetal hydrocephalus. J Biomater Appl. 2022 Sep 5:8853282221125309. doi: 10.1177/08853282221125309. Epub ahead of print. PMID: 36063383.

From: https://neurosurgerywiki.com/wiki/ - **Neurosurgery Wiki**

Permanent link: https://neurosurgerywiki.com/wiki/doku.php?id=fetal_aqueductal_stenosis



Last update: 2024/06/07 02:58

1/1