

Poster presentation

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Programmable hydrocephalus shunt which cannot be unwillingly re-adjusted even in 3T MRI magnet

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Background

Adjustable hydrocephalus shunts are very popular in management of hydrocephalus. They are supposed to help in minimizing number of revisions. Drawback of almost all constructions is that they may be accidentally readjusted in relatively weak magnetic field (around 30–40 mili Tesla)

Materials and methods

ProGav Miethke shunt contains an adjustable ball-on-spring valve and an integrated over drainage compensating gravitational device (known as ShuntAssistant). Special mechanical 'brake' is supposed to change the valve's performance level even in strong magnetic field. We evaluated the performance and hydrodynamic properties of a sample of three valves at different performance levels and in different orientations (horizontal or vertical)

Results

All the shunts showed good mechanical durability over the period of testing (3 months) and stability of hydrodynamic performance over a 28 day period.

The pressure-flow performance curves, operating, opening and closing pressures fell within the limits specified by the manufacturer, and changed according to the programmed performance levels. Operating pressure increased in vertical position by the value resulting from the performance of Shunt Assistant. The valve has a low hydrodynamic resistance (0.53 mm Hg/(ml/min)). External program-

ming proved to be easy and reliable. Strong magnetic fields (3Tesla MRI scanner) are not able to change the programming of the valve.

Conclusion

From the point of view of its hydrodynamic performance, the ProGAV shunt is reliable, differential pressure, low resistance, and adjustable valve, able to limit posture-related overdrainage. Unlike other adjustable valves, the ProGAV cannot be accidentally re-adjusted by external magnetic field even in 3T MRI magnet.