

Poster presentation without discussion

Intelligent design? Status and perspectives of hydrocephalus valves

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Background

After an explosive development of the first simple valves in the fifties the technology stagnated over 30 years and consisted preferably of cloning. Antisiphon valves were inaugurated in 1973, gravitational 75, adjustable valves in 84 (open adjustable precursors 50/69!) and negative feed-back regulated Orbis-Sigma 87, but played no role before the nineties. In contrast to sophisticated technologies, theoretical advantages and threefold prices, most studies with adjustable, Orbis- and antisiphon-valves showed similar results as old designs. Especially the prospective studies demonstrated no superiority of new concepts. Is the impression of a minor role of valves correct?

Materials and methods

We tested 750 valves (346 new) in vitro: 89 designs, 25 companies, 123 adjustable, 131 gravitational, 54 antisiphon, 32 feed-back regulated. The explanted specimen had short tests, but careful inspections; the new passed an ISO-conform test battery with max.35 subtests. 234 had long-term-tests, of them 111 over 300–500 days.

Results

56 years after Nulsen the problems of inaccuracy, drift, instable valve bodies and especially over drainage in upright are not sufficiently solved in most designs. The weak point of all antisiphon-concepts (& Delta/Strata) is the excessive susceptibility to external pressures, of Orbis-Sigma the tiny internal dimensions. Adjustable valves alone over drain. Their magnetic susceptibility is a source

of permanent troubles, which increases in the age of omnipresent electric fields and 3-T-MRIs. Safe was Sophysa Polaris and Miethke ProGAV only. With respect to over drainage gravitational valves were superior. However, they need adjustability for adaptation on growth or abdominal counter pressure; one adjustable is patented.

Conclusion

The developmental potential of mechanical designs is not exhausted. The current state-of-the-art may be the crossover of gravitational and adjustable valves with a "brake".