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202 "Premium Valves" in Bench-Tests: Adjustable vs. Autoregulating vs. Antisiphon vs. Gravitational Valves

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Introduction: More recent valves designs intend to avoid the overdrainage. Surprisingly the number of published tests is limited and studies with a statistical impact are missing.

Material: 202 valves of the "second generation", of them 71 adjustable (2 Kuffer, 54 Medos, 15 Sophysa, 28 autoregulating (Orbis-Sigma, Diamond, SiphonGuard), 45 antisiphons (ASD, SCD, Delta, Equiflow, Multipurpose, Beverley) and 55 gravitational valves (Hakim-Lumbar, Cordis GCA, Chhabra Z-Flow, Sophysa AS, Miethke-Dual-Switch, -Shunt-Assistent, PaediGAV) were tested in laboratory.

Methods: We proved the accuracy, flow in horizontal/vertical position, the susceptibility to magnetic fields respect, walking movements (adjustable/gravitational valves) and other potential disturbing conditions.

Results: Adjustable, gravitational and SiphonGuard valves with balls usually showed a sufficient accuracy. The diaphragm- (antisiphon) and especially the autoregulating probes showed more problems.

Safety problems were common: All antisiphons were excessively susceptibile to any kind of external pressure, the adjustables to many daily magnetic fields, not only MRI. Gravitational valves were influenced by vertical movements, but the disturbing effect is limited.

Conclusions: Useful properties of the second-generation-valves are often counterbalanced by new dangers. The lab-results suggest, that they are not automatically superior to simple valve designs. The gravitational valves seem offer the available optimum.