Radiologic Identification of VP-Shunt valves and adjustment

The verification of shunt adjustment (so-called opening pressure) and also the primary identification of the implanted valve type can be a Problem in daily practice: Shunt pass is not always at hand and documents from external hospitals can be missing. Usually, a simple lateral skull X-ray helps to identify the type of valve and it’s adjustment. Most common shunt types used by European neurosurgeons are listed at this page. Furthermore, we have noted our own experiences with MRI safety for the valves. However, we strongly recommend to consult the manufacturer before MRI scans to verify the safety of the implanted product, the MRI protocols to scan the patients and the risks and hazards that may be associated with exposure to the high-field MRI. We DO NEITHER give any recommendation NOR clearance for performing an MRI for any of the listed implants!

GAV- / proGAV- Valves – Christoph Miethke GmbH, Germany

![GAV- / proGAV- Valves](image)

<table>
<thead>
<tr>
<th>Opening pressure for vertical posture</th>
<th>Coding of gravitational unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 cmH2O</td>
<td>small, no ring</td>
</tr>
<tr>
<td>15 cmH2O</td>
<td>large, no ring</td>
</tr>
<tr>
<td>20 cmH2O</td>
<td>large, 1 ring</td>
</tr>
<tr>
<td>25 cmH2O</td>
<td>large, 2 rings</td>
</tr>
<tr>
<td>30 cmH2O</td>
<td>large, 3 rings</td>
</tr>
<tr>
<td>35 cmH2O</td>
<td>large, 4 rings</td>
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</tbody>
</table>

Coding ring

a) large, 2 rings = 25 cmH2O,
b) small = 10 cmH2O

paediGAV – Valves – Christoph Miethke GmbH, Germany
According to our experience all valves are secure for imaging in 3T-MRTs. Programmable valve types (proGAV) can be checked with the verification tool. Thus, there is usually no need for skull X-rays. Unintended readjustment of the valve by magnetic fields of MRI scanners has not been observed by us, but has been reported. Opening pressure values are given in cm H2O (not mm H2O)! Please, also pay attention to manufacture’s safety and warning guidelines! www.miethke.com

**Codman Hakim Valves**

Codman Hakim Valves may be exposed to MRI magnetic fields up to 3T. Hakim valves are also available as fixed pressure valves (low-, medium- and high-pressure-valves). The latter do not require radiologic verification after MRI. Only programmable Hakim valves have to be checked by radiologic verification or by the use of a so-called VPV-programming tool. Pressure adjustments are in mmH2O units! Please, also pay attention to manufacture’s safety and warning guidelines! www.depuy.de/codman/hydrozephalus

**Codman SiphonGuard**

Codman SiphonGuard an add-on valve for the therapy of overdrainage (silt-ventricle syndrome). It is intended to prevent uncontrolled loss of CSF from the brain via the shunt system. It is MR-compatible and a valve without adjustment option. Thus, a check-up of the valve setting after MRI is not necessary. Please, also pay attention to manufacture’s safety and warning guidelines! www.depuy.de/codman/hydrozephalus
Codman (Cordis) Hakim non-programmable (fixed-pressure) and programmable micro valves

The fixed pressure valves do not require radiologic verification after MRI. Only programmable Hakim valves have to be checked by radiologic verification or by the use of a so-called VPV-programming tool. Pressure adjustments are in mmH2O units! Please, also pay attention to manufacture’s safety and warning guidelines! www.depuy.de/codman/hydrozephalus

Codman Certas Valve

The Certas Valve is the first generation of programmable differential pressure Certas valves by Codman and has been discontinued due to problems during MRI scanning and accidental reprogramming. Please, check current information of the manufacturer, as radiological verification of shunt adjustment can be recommended. Please, also pay attention to manufacture’s safety and warning guidelines! www.depuy.de/codman/hydrozephalus
Codman Certas Valve Plus

Das Certas Ventil is the latest generation of programmable differential pressure Certas valves by Codman and been declared MRI safe up to 3 Tesla. Please, check current information of the manufacturer, as radiological verification of shunt adjustment can be recommended. Please, also pay attention to manufacture's safety and warning guidelines! www.depuy.de/codman/hydrozephalus

Medtronic (PS Medical) Strata Valve

Strata valves and their flow-regulation adjustment can be identified in plain skull X-rays. MRI scanners up to 3 Tesla are quoted to be safe, but a post-MRI radiologic check of adjustment is recommended in literature. Please, also pay attention to manufacture's safety and warning guidelines! www.medtronic.com/for-healthcare-professionals/products-therapies/neurological/shunts/index.htm

Sophy SM8 and Polaris Valves – Sophysa

In literature, MRT scans with scanners up to 3 Tesla are possible, but rare accidental readjustments have occurred. A radiologic check after MRI is recommended to verify correct adjustment. Both valve types are programmable in pressure levels of mmH20 – Sophy-Valve using 8 and Polaris offering 5 possible opening pressure settings. Please, also pay attention to manufacture's safety and warning guidelines! www.sophysa.com

Spitz-Holter Ventil, Integra

Spitz-Holter-Valves have been used routinely in Leipzig during 60s and 70s and are very long-lasting. We have no negative experience with MRI scans with up to 1.5T even in valves older than 25 years. There is possibility to identify the opening pressure type of the valve in X-ray (low, medium, high pressure types of valves). Please, also pay attention to manufacture's safety and warning guidelines! www.integralife.com

Integra Omni-Shunt System

The Omni-Shunt System is a non-programmable differential pressure valve. We have never noticed any malfunction in correlation to MRI scans up to 1.5 Tesla yet. There is possibility to identify the opening pressure type of the valve in X-ray (low, medium, high pressure types of valves). Please, also pay attention to manufacture's safety and warning guidelines! www.integralife.com

Integra DP valve (Differential-pressure) System
The DP-valve (TM) System is a non-programmable differential pressure valve. We have never noticed any malfunction in correlation to MRI scans up to 1.5 Tesla yet. There is possibility to identify the opening pressure type of the valve in X-ray (low, medium, high pressure types of valves). Please, also pay attention to manufacture's safety and warning guidelines! www.integralife.com

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