Technological Advances in Hydrocephalus Treatment: Shunts and Beyond

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Abstract

The treatment of hydrocephalus has signifcantly evolved over the past few decades, with technological advances playing a central role in improving patient outcomes. Traditional shunt systems, while life-saving, have been associated with numerous complications and limitations. Recent innovations have focused on enhancing shunt technology through programmable valves, anti-siphon devices, and biocompatible materials to reduce failure rates and improve patient comfort. Beyond shunts, emerging treatments such as endoscopic third ventriculostomy (ETV) and the use of neuroendoscopy ofer less invasive alternatives with promising results. Furthermore, advancements in imaging techniques and biomarker research are enhancing diagnostic accuracy and enabling more personalized treatment approaches. This review highlights the current state of hydrocephalus treatment, emphasizing the impact of technological advancements on surgical techniques, device development, and overall patient care. The integration of these innovations holds the potential to transform the management of hydrocephalus, ofering hope for better long-term outcomes and quality of life for patients.

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