Ventriculitis treatment

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In 2017, the Infectious Diseases Society of America (IDSA) published guidelines for healthcare-associated ventriculitis treatment and meningitis treatment [1)].

Rapid drainage and irrigation of pus and debris may be beneficial for reducing inflammation and preventing intraventricular septation and subsequent isolated ventricular enlargement. Early diagnosis of ventriculitis may significantly improve the overall outcome, and MRI plays an important role as a first-line diagnostic tool [2)].

Ventricular irrigation

Ventricular irrigation.

Antibiotics

Antibiotics for ventriculitis treatment.

Case reports

Endoscopic washout for medically refractory cerebral ventriculitis [3)].

If not controlled in the early stage, ventriculitis is difficult to treat neurosurgically and can lead to serious sequelae, a long course of treatment, and hospitalization. We report two cases of ventriculitis and progressive hydrocephalus after shunt infection. Both were successfully treated by neuroendoscopic septostomy in combination with thorough intraventricular irrigation through a single burr hole followed by single shunt revision. Although surgical intervention has not been established as a first-choice treatment for ventriculitis, including early-stage ventriculitis, prompt neuroendoscopic surgery appears effective for the management of ventriculitis and hydrocephalus after shunt infection. The strategy described in this report might be useful to avoid recurrent shunt infections and malfunctions, simplify a shunt, and reduce the overall duration of hospitalization [4].

Clinical Practice Guidelines

2017 Infectious Diseases Society of America's Clinical Practice Guidelines for Healthcare-Associated Ventriculitis and Meningitis [5].

Preventive measures for VRI include prolonged prophylactic systemic antibiotics (PSAs) and antibiotic impregnated catheter.

Randomized clinical trials and observational-derived evidence support the use of PSAs throughout the duration of external ventricular drainage; similarly, the use of antibiotic impregnated catheters to prevent VRI seems to be beneficial. Available data are heterogeneous and of suboptimal quality. Further research is needed to confirm the findings of this meta-analysis. There are not sufficient data to compare the protective effect of ac-EVDs and PSAs [6].

Regarding CSF infection rate and dysfunction, no statistical significant differences between the two EVD catheters Bactiseal(®) versus VentriGuard(®) were found. The silver-bearing catheter might offer a safe and cost-conscious alternative to the antibiotic-impregnated (AI) catheter [7].

Silver-bearing EVD catheters implanted with a bolt-kit system outside the operating room do not significantly elevate the risk of CSF infection as compared to conventional implant methods [8].

A standardised questionnaire prepared by the Commission of Technical Standards and Norms of the German Society of Neurosurgery was sent to 127 neurosurgical units in Germany.

Data were analysed from 99 out of 127 neurosurgical units which had been contacted. Overall, more than 10,000 EVD procedures appear to be performed in Germany annually. There is disagreement about the location where the EVD is inserted, and most EVDs are still inserted in the operation theatre. Most units apply subcutaneous tunnelling. Impregnated EVD catheters are used regularly in only about 20 % of units. Single-shot antibiotic prophylaxis is given in more than half of the units, while continued antibiotic prophylaxis is installed in only 15/99 units at a regular basis. There are discrepancies in the management of prolonged EVD use with regard to replacement policies. Regular cerebrospinal fluid (CSF) sampling is still performed widely. There were no statistical differences in policies with regard to academic versus non-academic units.

This survey clearly shows that some newer recommendations drawn from published studies penetrate much slower into clinical routine, such as the use of impregnated catheters, for example. It remains

unclear how different policies actually impact quality and outcome in daily routine [9].

Prevention

see Ventriculostomy related infection prevention.

1)
Tunkel AR, Hasbun R, Bhimraj A, et al. 2017 Infectious Diseases Society of America's Clinical Practice Guidelines for Healthcare-Associated Ventriculitis and Meningitis. Clin Infect Dis. 2017;64(6):e34-e65. doi:10.1093/cid/ciw861
2)
Fujikawa A, Tsuchiya K, Honya K, Nitatori T. Comparison of MRI sequences to detect ventriculitis. AJR Am J Roentgenol. 2006 Oct;187(4):1048-53. PubMed PMID: 16985156.
3)
Yuen J, Chen B, Brent A, Plaha P. Endoscopic washout for medically refractory cerebral ventriculitis. J Neurosurg Sci. 2018 Aug;62(4):523-526. doi: 10.23736/S0390-5616.17.03967-4. PubMed PMID: 29938481.
4)
Tabuchi S, Kadowaki M. Neuroendoscopic surgery for ventriculitis and hydrocephalus after shunt infection and malfunction: Preliminary report of a new strategy. Asian J Endosc Surg. 2015 May;8(2):180-4. doi: 10.1111/ases.12162. PubMed PMID: 25913583; PubMed Central PMCID: PMC4437183.
5)
Tunkel AR, Hasbun R, Bhimraj A, Byers K, Kaplan SL, Michael Scheld W, van de Beek D, Bleck TP, Garton HJ, Zunt JR. 2017 Infectious Diseases Society of America's Clinical Practice Guidelines for Healthcare-Associated Ventriculitis and Meningitis. Clin Infect Dis. 2017 Feb 14. doi: 10.1093/cid/ciw861. [Epub ahead of print] PubMed PMID: 28203777.
6)
Sonabend AM, Korenfeld Y, Crisman C, Badjatia N, Mayer SA, Connolly ES Jr. Prevention of ventriculostomy-related infections with prophylactic antibiotics and antibiotic-coated external ventricular drains: a systematic review. Neurosurgery. 2011 Apr;68(4):996-1005. doi: 10.1227/NEU.0b013e3182096d84. Review. PubMed PMID: 21221026.
7)
Winkler KM, Woernle CM, Seule M, Held U, Bernays RL, Keller E. Antibiotic-impregnated versus silver-bearing external ventricular drainage catheters: preliminary results in a randomized controlled trial. Neurocrit Care. 2013 Apr;18(2):161-5. doi: 10.1007/s12028-013-9816-3. PubMed PMID: 23397566.
8)
Fichtner J, Jilch A, Stieglitz LH, Beck J, Raabe A, Z' Graggen WJ. Infection rate of emergency bolt-kit vs. non-emergency conventional implanted silver bearing external ventricular drainage catheters. Clin Neurol Neurosurg. 2014 Jul;122:70-6. doi: 10.1016/j.clineuro.2014.04.018. Epub 2014 May 1. PubMed PMID: 24908221.
9)
Cinibulak Z, Aschoff A, Apedjinou A, Kaminsky J, Trost HA, Krauss JK. Current practice of external ventricular drainage: a survey among neurosurgical departments in Germany. Acta Neurochir (Wien). 2016 May;158(5):847-53. doi: 10.1007/s00701-016-2747-y. Epub 2016 Mar 1. Review. PubMed PMID: 26928728.