Chronic Subdural Medical Management

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KEYWORDS

• Subdural hematoma • Medical management • Nonoperative • Antiepileptic drug • Steroid
• HMG-CoA reductase inhibitor • Angiotensin-converting enzyme inhibitor • Antifibrinolytic

KEY POINTS

- Prophylactic antiepileptic medication use is recommended for patients with symptomatic, chronic subdural hematomas (cSDHs) deemed at high risk for seizure.
- Both asymptomatic and, mildly symptomatic, good grade cSDH may be amenable to nonoperative medical management.
- Steroid therapy decreases inflammatory mechanisms that contribute to hyperpermeability and angiogenesis in cSDH, and has evidence for a role in nonoperative, medical management of cSDH.
- 3-Hydroxy-3-methylglutaryl-coenzyme A reductase inhibitors, angiotensin-converting enzyme inhibitors, and antifibrinolytic agents are other proposed medical treatments to cSDH that require further study.

INTRODUCTION

Chronic subdural hematoma (cSDH), which is characterized by a time course of weeks to months, has become an increasingly detected neurosurgical disease. This increased prevalence can be attributed in part to a growing aging population and increased antithrombotic medication use. However, uniform consensus guidelines are lacking because of the heterogeneity of both the disease and the collection of data and outcomes surrounding it. Surgical drainage via burr-hole craniostomy has been the mainstay of treatment of symptomatic cSDH, but conservative management options are considered in those patients who have asymptomatic, small-volume cSDH, or for those in whom surgery carries a high risk. This article focuses on the current practices, potential strategies, and evidence for the medical management of cSDHs.

PATIENT EVALUATION OVERVIEW

cSDH is an increasingly detected disease in the elderly, with estimates of about 10 per 100,000 a year[1] (further details on epidemiology, pathophysiology, and history of cSDH are presented elsewhere). Presentations can vary widely ranging from mild symptoms of headaches or subtle behavioral changes to more clinically significant symptoms of focal weakness, gait disturbance, seizures, or decreased mental status. These symptoms are often gradual and can be progressive over a course of days to weeks. A preceding history of head trauma may be either minor or absent in cases of cSDH.

The preferred imaging modality is a computed tomography (CT) scan with a hematoma appearance that can range from isodense (30–60 Hounsfield units) to hypodense (<30 Hounsfield units); the transition from the hyperdense appearance of an acute hematoma to that of a cSDH typically

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occurs after 3 weeks. It is unclear if clinical and radiographic characteristics can determine the progression and subsequent of cSDH. However, some cohort studies have shown that worse admission Glasgow Coma Scale (GCS) and modified Rankin Scale (mRS) scores may be associated with worse outcomes.[2,3] To be able to better characterize the clinical grades of patients with cSDH, the Markwalder score was created. Higher grades were associated with lower rates of perioperative brain expansion in the original study (**Table 1**).[4] This scoring system is now primarily used as a tool to evaluate the clinical severity of cSDH, with higher scores being associated with more severe injury. Neuroimaging characteristics, particularly the size of the hematoma, may be associated with outcome as small, asymptomatic cSDHs may spontaneously resolve and be associated with better outcomes.

cSDH has been associated with lower mortality compared with acute subdural hematoma (SDH). Early literature quoted low mortality rates of 2.8% for patients with cSDH who received surgery[5] compared with widely ranging rates of 40% to 90% in patients with acute SDH receiving surgery.[6] However, lengths of follow-up for the patients with cSDH in these initial reviews were unclear, and subsequent retrospective follow-up studies found much higher rates of mortality in surgically treated cSDH: 16% on discharge and 32% at 1 year.[7] This evidence revealed that cSDH is not a benign disease and has supported the widespread practice of surgical intervention with evidence of favorable outcomes after surgery.

Alternatively, because cSDH is increasingly detected in patients with minimal or no symptoms, invasive surgical treatments may not be the best approach in all cases. Previously utilized, conservative watch-and-wait approaches have been suboptimal, because many of these conservatively managed patients gradually develop symptoms and continue to have expansion of their cSDH that necessitates surgery. However, evidence is now emerging for initial conservative measures involving medical management for patients with asymptomatic or low-grade small-volume cSDH, or for those in whom surgery poses great risk. Regardless of the selection of treatment (whether it be surgical or medical), close follow-up of these patients is paramount; although cSDH was once thought to be benign, it is now known to be associated with mortality both during hospitalization and after discharge.

Table 1
Markwalder Score for cSDH

Grade 0	Asymptomatic
Grade 1	Alert, oriented, mild symptoms
Grade 2	Drowsy or disoriented, variable neurologic deficits
Grade 3	Stuporous but responding appropriately to noxious stimuli, severe focal signs
Grade 4	Comatose, absent motor response to painful stimuli, decerebrate or decorticate posturing

From Markwalder TM, Steinsiepe KF, Rohner M, et al. The course of chronic subdural hematomas after burr-hole craniostomy and closed-system drainage. J Neurosurg 1981;55:391; with permission.

ANTIEPILEPTIC USE

A cornerstone of medical management in this patient population is the prevention and treatment of seizures. However, studies investigating the role for prophylactic antiepileptic drugs (AEDs) in cSDH have had mixed results, preventing guidelines from making high-level recommendations due to a lack of class I evidence. It is still common practice to start patients with cSDH on prophylactic AEDs, most likely because of the high rates of seizures reported in older literature. However, closer evaluation reveals that the incidence of seizures varies widely from one study to another, with a range from 2% to 17%[8] and increasing to up to 23% postoperatively.[9] This variability most likely stems from heterogeneous cSDH severity and differences in surgical treatment. Meanwhile, the incidence of seizures in nonoperative, spontaneously resolving cSDH is unknown.

Although the necessity of treating seizures in the setting of cSDH is clear, the utility of prophylactic AEDs depends on appropriate patient selection; patients with cSDH are more likely to be vulnerable to side effects of AEDs given their older age, and any benefit may therefore be offset by these risks. There have been no comparative randomized controlled trials that address this issue, although there are several retrospective studies on the role of prophylactic AEDs that have yielded mixed results. A retrospective Japanese review of 129 patients with cSDH revealed a low preoperative seizure rate of 1% in its population (N = 2; both in nonprophylactic group). There were 73 patients who received prophylactic AEDs (phenobarbital) and 56 who did not. Postoperatively, only 2 patients developed seizures, with both patients being in the nonprophylactic AED group; however, both were thought to be related to surgical technique and severity of injury. As a result, the investigators