Case Report

Safe Use of Tissue Plasminogen Activator in Conjunction with the Integra Camino Bolt for the Drainage of Chronic Subdural Hematoma

Abstract
Chronic subdural hematoma (CSDH) is a relatively common condition encountered in a neurosurgical practice. There have been increased efforts in creating different treatment regimens for CSDH to improve patients’ outcomes, including the addition of tissue plasminogen activator (tPA) in drains to reduce recurrences. Here, we present the first case report of the safe use of tPA in conjunction with an Integra Camino bolt for maximized drainage of CSDH with a successful neurological recovery and the complete resolution of the hematoma.

Keywords: Chronic subdural hematoma, integra camino bolt, subdural evacuating port system, surgical decompression, traumatic brain injury

Introduction
Chronic subdural hematoma (CSDH) is a relatively common condition encountered in a neurosurgical practice with an estimated incidence of 58 per 100,000 and prevalence of 8.2 per 100,000 patients over the age of >65 years. The incidence of CSDH is expected to increase over the course of the next 25–30 years. Currently, there is no general consensus among the neurosurgical community regarding an optimal treatment protocol for these patients. Treatments for CSDH include burr hole drainage, twist drill drainage, or craniotomy for hematoma evacuation. While craniotomy and burr hole drainage are conducted under general anesthesia in an operating room setting, twist drill drainage can be conducted at the bedside without the need for general anesthesia. Published literature data suggest that both of these drainage procedures lead to similar success with recurrence rates of 21% for burr hole drainage versus 25% for twist drill drainage. There have been increased efforts in creating different treatment regimens for CSDH to improve patients’ outcomes, including the addition of tissue plasminogen activator (tPA) in drains to reduce the recurrence of CSDH. Here, we present the first case report of the safe use of tPA in conjunction with an Integra Camino bolt for maximized drainage of CSDH with a successful neurological recovery and the complete resolution of the hematoma.

Case Report
The patient is an 82-year-old male with a history of coronary artery disease, hypertension, and anxiety who presented with altered mental status after a fall, a week before the admission. Computed tomography (CT) of the head during this admission demonstrated a chronic left subdural hematoma. Given symptom and the size of the CSDH, the patient underwent the placement of the Integra Camino bolt to drain the CSDH. Due to poor drainage overnight, 0.5 mg of tPA was administered through the bolt to the subdural space to facilitate further drainage of CSDH. Following the administration, the drain was clamped for thirty minutes after which the device was placed back to negative pressure. A total output of 64 mL of oil-like fluid was collected over the course of 2 days at which time the drain was removed. At the 2-week neurosurgical follow-up, the patient has improved back to his neurological baseline, and CT of the head demonstrated the complete resolution of the CSDH.
Discussion

Current literature shows that both a twist drill drainage and burr hole drainage are adequate options in the treatment of CSDH with no statistical differences and that the placement of drains for postoperative drainage decreases recurrent rates by up to 60%. In fact, a drainage of at least >200 mL has been shown to decrease recurrent rates. There have been multiple efforts on introducing new changes to improve patients’ outcomes such as an introduction of a hollow screw such as a subdural evacuating port system (SEPS) to improve draining of the hematoma and decrease complications. Furthermore, we recently proposed a novel, easy-to-do, low-cost technique on using the widely available Integra Camino bolt as a hollow screw to achieve similar outcomes compared to SEPS. In an effort to improve outcomes, recent research comparing the recurrent rates of patients who underwent evacuation of CSDH with tPA and without tPA demonstrated that patients who underwent evacuation with tPA had zero recurrence compared to 22.5% recurrent rates in patients who did not receive tPA. In this report, we present the first case report of the safe use of tPA in conjunction with an Integra Camino bolt for maximized drainage of CSDH with a successful neurological recovery and the complete resolution of the hematoma [Figure 1].

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Conflicts of interest

There are no conflicts of interest.

References

1. Neils DM, Siganallur PS, Wang H, Tracy P, Klopfenstein J, Dinh D, et al. Recurrence-free chronic subdural hematoma: A retrospective analysis of the instillation of tissue plasminogen activator in addition to twist drill or burr hole drainage in the treatment of chronic subdural hematomas. World Neurosurg 2012;78:145-9.
2. Cenic A, Bhandari M, Reddy K. Management of chronic subdural hematoma: A national survey and literature review. Can J Neurol Sci 2005;32:501-6.
3. Santarius T, Kirkpatrick PJ, Kolias AG, Hutchinson PJ. Working toward rational and evidence-based treatment of chronic subdural hematoma. Clin Neurosurg 2010;57:112-22.
4. Chari A, Kolias AG, Santarius T, Bond S, Hutchinson PJ. Twist-drill craniostomy with hollow screws for evacuation of chronic subdural hematoma. J Neurosurg 2014;121:176-83.
5. Tabaddor K, Shulmon K. Definitive treatment of chronic subdural hematoma by twist-drill craniostomy and closed-system drainage. J Neurosurg 1977;46:220-6.
6. Horn EM, Feiz-Erfan I, Bristol RE, Spetzler RF, Harrington TR. Bedside twist drill craniostomy for chronic subdural hematoma: A comparative study. Surg Neurol 2006;65:150-3.
7. Asfora WT, Schwebach L. A modified technique to treat chronic and subacute subdural hematoma: Technical note. Surg Neurol 2003;59:329-32.
8. Emonds N, Hassler WE. New device to treat chronic subdural hematoma – hollow screw. Neurol Res 1999;21:77-8.
9. Liu W, Bakker NA, Groen RJ. Chronic subdural hematoma: A systematic review and meta-analysis of surgical procedures. J Neurosurg 2014;121:665-73.
10. Kwon TH, Park YK, Lim DJ, Cho TH, Chung YG, Chung HS, et al. Chronic subdural hematoma: Evaluation of the clinical significance of postoperative drainage volume. J Neurosurg 2000;93:796-9.