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Endoscope-Assisted Evacuation of Subdural Hematoma and Middle Meningeal Artery Embolization in a Single Session in the Angiography Suite: 2-Dimensional Operative Video

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Chronic subdural hematoma (cSDH) is among the most common conditions requiring neurosurgical intervention. Open craniotomy and burr holes for evacuation are frequently used to treat chronic and acute-on-chronic subdural hematomas, yet hematoma recurrence has been reported in 2% to 37% of patients after an initial operation.¹⁻⁵ A substantial proportion of recurrences requires secondary procedures. Embolization of the middle meningeal artery (MMA) has been increasingly used to treat cSDH, either alone or as an adjunct to surgical evacuation.⁶ Multiple case series have suggested that endovascular therapy may be effective as a stand-alone or adjunctive procedure to reduce the rates of hematoma recurrence after evacuation.⁷⁻¹² Several randomized clinical trials of MMA embolization for the treatment of cSDH are in progress. We present a variation on the technique that may expedite complete, minimally invasive treatment of cSDH. We introduce the concept of endoscope-assisted subdural hematoma evacuation in the angiography suite, with immediate postoperative MMA embolization. We present this technique in the context of a case of an older adult on anticoagulant therapy and found to have an acute-on-chronic subdural hematoma. The patient consented to the procedure and to the publication of his/her image. The angiography suite additionally facilitates the use of intraoperative computed tomography to ensure evacuation completeness before proceeding immediately with embolization. The rationale for this protocol is based on the benefits of durable, minimally invasive surgical evacuation in patients with multiple comorbidities; direct visualization to the solid components of the hematoma and its associated membranes; and reducing the rate of postoperative recurrence using endovascular therapy.^{13,14}

Product Information: The use of n-BCA glue for this indication was off-label as of the time of this procedure and is currently investigational.

KEY WORDS: Subdural hematoma, Middle meningeal artery embolization, Hybrid operating rooms, Neuroendoscopy, Endoscopy, Endoscope-assisted, Angiography, Endoscopic

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Disclosures

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investigator at Mount Sinai Health System. The procedures described here were performed before beginning patient enrollment into the MEMBRANE trial. J. Mocco is a consultant for Viseon, Endostream, RIST, Synchron, Perflow, Viz.ai, and CVAid. J. Mocco is an investor for Imperative Care, Endostream, Echovate, Viseon, BlinkTBI, Serenity, NTI Managers, RIST, Viz.ai, Synchron, Songbird, Tulavi, Vastrax, Neuroolutions, Radical, E8, Borvo, and Spinaker. Christopher P. Kellner was a consultant for Medtronic.

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