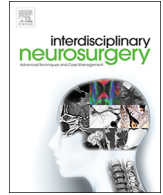




Contents lists available at ScienceDirect

Interdisciplinary Neurosurgery: Advanced Techniques and Case Management

journal homepage: www.inat-journal.com

Case report

Hemorrhagic complications of intraoperative neurophysiologic monitoring needle electrodes

William J. Ares, M.D.^a, Nitin Agarwal, M.D.^a, Jeffrey Balzer, Ph.D.^{a,b}, Brian T. Jankowitz, M.D.^{a,*}^a Department of Neurological Surgery, University of Pittsburgh Medical Center, Pittsburgh, PA 15206, United States^b Center for Clinical Neurophysiology, University of Pittsburgh Medical Center, Pittsburgh, PA 15206, United States

ARTICLE INFO

Article history:

Received 19 March 2017

Revised 28 March 2017

Accepted 16 April 2017

Available online xxxx

Keywords:

Neurophysiologic monitoring

Hemorrhage

Complication

ABSTRACT

Background: Intraoperative neurophysiologic monitoring is a commonly used adjunct during many neurointerventional procedures.

Objective: Here we describe the rare occurrence of a hemorrhagic complication secondary to a subdermal needle electrode.

Methods: A 67 year old male with a left-sided fusiform vertebrobasilar aneurysm was scheduled to undergo placement of a pipeline embolization device. The patient had been administered aspirin 325 mg and Plavix 75 mg daily for greater than one week preoperatively. After successfully undergoing endotracheal intubation, 7 mm length and 0.4 mm diameter subdermal needle electrode intraoperative monitoring leads were placed in the scalp, mastoid and bilateral Erb's points. Following successful completion of the procedure, but prior to extubation and closure of the femoral arterial site, the patient was noted to have a significant amount of swelling in the left neck and supraclavicular region in the immediate vicinity of the left Erb's point subdermal needle electrode. Review of the last angiographic run in the region noted active extravasation from a muscular branch of the suprascapular artery immediately subjacent to the aforementioned subdermal electrode. The literature has been reviewed and recommendations for management and surveillance are made.

Results: This case underscores the importance of monitoring and risk minimization in regards to hemorrhagic complications, especially in patients who are anticoagulated and receiving dual antiplatelet therapy, during neurointerventional procedures.

Conclusion: Hemorrhagic complications associated with subdermal needle electrodes, though rare, can have significant consequences in patients.

© 2017 The Authors. Published by Elsevier B.V. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

1. Introduction

Intraoperative neurophysiologic monitoring (IOM) is a commonly used adjunct in many neuro-endovascular procedures to serve as a surrogate neurologic examination [1–3]. While widely cited as a tool to diagnose and avoid complications during these procedures, the act of collecting IOM data is rarely, if ever, cited to itself be a source of complications. Here we describe a clinically significant hemorrhagic complication secondary to a subdermal needle electrode used for neurophysiologic recordings during an intracranial endovascular embolization. The patient discussed below has given informed consent to be

Abbreviations: IOM, intraoperative neurophysiologic monitoring; EEG, electroencephalography; SSEP, somatosensory evoked potentials; BAER, brainstem auditory evoked responses; PRU, P2Y12 Reaction Units; ACT, activated clotting time; CT, computed tomography.

* Corresponding author at: Department of Neurological Surgery, University of Pittsburgh Medical Center, 200 Lothrop Street, Suite B400, Pittsburgh, PA 15206, United States.

E-mail address: jankbt@upmc.edu (B.T. Jankowitz).

featured in this case report and has signed the appropriate release forms as designated by our hospital system for publication of his image.

2. Clinical presentation

A 67 year old male with a left-sided fusiform vertebrobasilar aneurysm was scheduled to undergo placement of a pipeline embolization device. The patient had been administered aspirin 325 mg and Plavix 75 mg daily for greater than one week preoperatively. Prior to the procedure, a plavix response assay was obtained with a resultant P2Y12 Reaction Units (PRU) of 62 (less than 192 indicates appropriate Plavix response). Laboratory values obtained the day prior to the procedure were notable for a platelet count of 131 and an INR of 1.1. After successfully undergoing endotracheal intubation, 7 mm length and 0.4 mm diameter subdermal needle electrode IOM leads were placed in the scalp, mastoid and bilateral Erb's points for recording of electroencephalography (EEG), somatosensory evoked potentials (SSEP) and brainstem auditory evoked responses (BAER). A baseline activated clotting time (ACT) drawn at the outset of the procedure was 104 s. Following



Fig. 1. A left neck and suprascapular region hematoma can be seen. Blue circle marks the previous location of the IOM needle electrode. (For interpretation of the references to color in this figure legend, the reader is referred to the web version of this article.)

placement of the arterial sheath, the patient was heparinized with 6000 units of heparin with a resultant ACT of 209 s. Throughout the procedure, the patient received 4000 additional units of heparin with a

peak ACT of 229. No other anti-coagulant medications were administered. Protamine was not administered at the termination of the embolization. Following successful completion of the procedure, but prior to extubation and closure of the femoral arterial site, the patient was noted to have a significant amount of swelling in the left neck and supraclavicular region in the immediate vicinity of the left Erb's point subdermal needle electrode (Fig. 1). Review of the last angiographic run in the region noted active extravasation from a muscular branch of the suprascapular artery immediately subjacent to the aforementioned subdermal electrode (Fig. 2). Manual pressure at the presumed site of hemorrhage was attempted, but given the medially expansile nature of the hematoma and the concern for airway compromise, a decision was made to manage the hemorrhage via an endovascular approach. Via the existing 5F sheath, a 5F vert catheter was advanced into the left subclavian artery. Under roadmap guidance, a rapid transit microcatheter was advanced into the target artery and the distal aspect of the vessel was embolized with Onyx-18 (Fig. 3). Repeat angiographic runs after embolization showed no further extravasation (Fig. 4). The patient was transferred to the intensive care unit (ICU) in stable condition. The patient did experience a decrease in hemoglobin from 12 g/dL to 10.5 g/dL however did not require a blood transfusion. Extubation was delayed given mass effect on the trachea but neurologic exam was unchanged from pre-procedure. A computed tomography (CT) scan obtained after the procedure demonstrated significant stranding of the fatty tissues extending from the left neck to the left axilla consistent with hematoma. The embolus was clearly seen in the supraclavicular soft tissues (Fig. 5).

3. Discussion

Intraoperative neurophysiologic monitoring, while commonly used during neurosurgical procedures, is a rare source of complications. A Pubmed search utilizing combinations of the terms “neurophysiologic monitoring”, “hemorrhage”, “subdermal electrode” and “complication” revealed no previous descriptions of the above described phenomenon. The limited literature focusing on complication avoidance with the use of subdermal neurophysiologic needle electrodes focuses on pressure related and thermal injuries [4]. While the benefit of utilizing adjuncts such as neurophysiologic monitoring likely outweigh the rare risks, it behooves the neurointerventionalist to keep in mind the hemorrhagic



Fig. 2. Subtracted and unsubtracted angiographic runs demonstrate active extravasation of contrast at the site of the subdermal needle electrode.

Download English Version:

<https://daneshyari.com/en/article/5629385>

Download Persian Version:

<https://daneshyari.com/article/5629385>

[Daneshyari.com](https://daneshyari.com)