

# Incidence of Postoperative Hematomas Requiring Surgical Treatment in Neurosurgery: A Retrospective Observational Study

Kadri Lillemäe<sup>1,2</sup>, Johanna Annika Järviö<sup>1</sup>, Marja Kaarina Silvasti-Lundell<sup>1,2</sup>, Jussi Juha-Pekka Antinheimo<sup>1,3</sup>, Juha Antero Hernesniemi<sup>1,3</sup>, Tomi Tapio Niemi<sup>1,2</sup>

OBJECTIVE: We aimed to characterize the occurrence of postoperative hematoma (POH) after neurosurgery overall and according to procedure type and describe the prevalence of possible confounders.

METHODS: Patient data between 2010 and 2012 at the Department of Neurosurgery in Helsinki University Hospital were retrospectively analyzed. A data search was performed according to the type of surgery including craniotomies; shunt procedures, spine surgery, and spinal cord stimulator implantation. We analyzed basic preoperative characteristics, as well as data about the initial intervention, perioperative period, revision operation and neurologic recovery (after craniotomy only).

**RESULTS:** The overall incidence of POH requiring reoperation was 0.6% (n = 56/8783) to 0.6% (n = 26/4726) after craniotomy, 0% (n = 0/928) after shunting procedure, 1.1% (n = 30/2870) after spine surgery, and 0% (n = 0/259) after implantation of a spinal cord stimulator. Craniotomy types with higher POH incidence were decompressive craniectomy (7.9%, n = 7/89), cranioplasty (3.6%, n = 4/112), bypass surgery (1.7%, n = 1/60), and epidural hematoma evacuation (1.6%, n = 1/64). After spinal surgery, POH was observed in 1.1% of cervical and 2.1% of thoracolumbar operations, whereas 46.7% were multilevel procedures. 64.3% of patients with POH and 84.6% of patients undergoing craniotomy had postoperative hypertension (systolic blood pressure >160 mm Hg or lower if indicated). Poor

#### Key words

- Delayed postoperative spinal epidural hematoma
- Neurosurgery
- POH
- Postoperative hematoma
- SEH
- Spinal epidural hematoma
- Spinal surgery

# Abbreviations and Acronyms

AVM: Arteriovenous malformation DPOSEH: Delayed postoperative spinal epidural hematoma DVT: Deep vein thrombosis ICU: Intensive care unit outcome (Glasgow Outcome Scale score 1–3), whereas death at 6 months after craniotomy was detected in 40.9% and 21.7%. respectively, of patients with POH who underwent craniotomy.

CONCLUSIONS: POH after neurosurgery was rare in this series but was associated with poor outcome. Identification of risk factors of bleeding, and avoiding them, if possible, might decrease the incidence of POH.

#### **INTRODUCTION**

n neurosurgery, postoperative hematoma (POH) is a rare, but serious, complication that frequently leads to severe neurologic impairment or death.<sup>1-3</sup> POH rates after intracranial procedures vary greatly, mainly because of the differences in defining POH.<sup>2</sup> It is not always possible to distinguish between expected residual blood and small de novo hemorrhages, and therefore, it has been concurred that the best definition for a significant postoperative intracranial hemorrhage is a hematoma clinically requiring surgical evacuation.<sup>2</sup>

Although some studies have reported POH after even up to 50% of craniotomies in certain subgroups and based on routine radiologic monitoring,<sup>2,4-6</sup> the overall incidence of clinically deteriorating POH range from 0.48% to 7.1%.<sup>1,2,7-21</sup> In spinal surgery, the incidence of epidural POH requiring surgical evacuation is reportedly 0.1%–3%.<sup>3,22-34</sup>

**POH**: Postoperative hematoma **VTE**: Venous thromboembolism

From the <sup>1</sup>Department of Perioperative, Intensive Care and Pain Medicine, Helsinki University Hospital, University of Helsinki, Helsinki; and Departments of <sup>2</sup>Anesthesiology and Intensive Care Medicine and <sup>3</sup>Neurosurgery, Helsinki University Hospital, Töölö Hospital, Helsinki, Finland

To whom correspondence should be addressed: Kadri Lillemäe, M.D. [E-mail: kadri.lillemae@hus.fi] Citation: World Neurosurg. (2017) 108:491-497. http://dx.doi.org/10.1016/j.wneu.2017.09.007

Journal homepage: www.WORLDNEUROSURGERY.org

Available online: www.sciencedirect.com

1878-8750/\$ - see front matter © 2017 Elsevier Inc. All rights reserved.

Because POH rates after neurosurgery vary greatly, the purpose of this study was to determine the incidence of POH overall in neurosurgery and according to procedure type. In addition, we aimed to describe the prevalence of previously described possible risk factors<sup>1-7,9-18,22-30,35-37</sup> for developing a perioperative bleeding complication in neurosurgery.

# **METHODS**

# **Data Collection**

This was a retrospective observational study. All neurosurgical patients at the Department of Neurosurgery in Helsinki University Hospital, Helsinki, Finland with POH requiring surgical removal between January 2010 and December 2012 were initially included in the study. Patients were identified simultaneously by our electronic database and logbook with primary procedure code defined as "postoperative hematoma." Every patient's electronic, as well as paper, medical record was analyzed regarding preexisting comorbidities, presence of previous surgeries on spine, preoperative and perioperative medication, initial intervention, perioperative period, revision operation, and neurologic recovery (this last factor after craniotomy only). All cases that were incorrectly coded in the electronic database or that showed an extracranial or no hematoma during reoperation were excluded from final analysis.

#### **Postoperative Care in the Study Center**

All patients after craniotomies and cervical intradural spinal procedures are admitted to the neurosurgical intensive care unit (ICU) until the first postoperative day (e.g., up to 24 hours). Patients after spinal surgery are generally monitored for 2-6 hours also in the same department. Postoperative imaging (computed tomography or magnetic resonance imaging) is performed in selective cases according to the surgeon's decision and patients' clinical status. Local protocol on deep vein thrombosis (DVT) chemoprophylaxis is conservative. Mechanical prophylaxis (compression stockings or intermittent pneumatic compression devices) is used in all patients at risk for DVT. Pharmacologic prophylaxis with low-molecular-weight heparin is started in high-risk patients within 5-7 days postoperatively but usually not earlier than 3 days after surgery. In complex cases, an individualized multidisciplinary approach, including an anesthesiologist, neurosurgeon, and thrombosis specialist, is implemented.

#### **Data Analysis**

Data are given as mean with standard deviation and range. Descriptive statistics were evaluated with Microsoft Excel, version 14.4.7 (Microsoft Corporation).

# RESULTS

#### **Incidence of POH**

During the 3-year period, 8783 procedures were performed, including 4726 craniotomies, 2870 spinal surgeries, 928 shunting procedures, and 259 implantations of spinal cord stimulators and drug pumps. In 0.6% of procedures (56 cases of 8783: 26 after craniotomies and 30 after spine operations), 53 patients had POH leading to surgical removal. Four patients with POH after craniotomy (17.4%) and one after spinal procedure (3.3%) had POH

more than once, whereas I patient with serious traumatic brain injury had 4 different procedures initially (decompressive hemicraniectomy on both sides that was later followed by cranioplasty to both sides), after which POH developed every time. Thus, the overall incidence of POH after craniotomies and spinal surgery was 0.6% and 1.1%, respectively.

### **Baseline Characteristics**

Patients' general data are summarized in Table 1. Patients had an average age of 60 years (range, 20–88) and 50.9% of patients were male. The most common underlying diseases were hypertension and diabetes, whereas about one third of patients for spinal procedure had previously had an operation on the same part of the spine.

#### **Risk Factors**

Of the possible risk factors described in earlier studies,<sup>1-7,9-18,22-30,35-37</sup> medications that have been reported to interfere with coagulation cascade (nonsteroidal antiinflammatory drugs, antiplatelet drugs, anticoagulants, selective serotonin reuptake inhibitors, and antiepilepsy drugs) were being used preoperatively or postoperatively in 66.1% of cases, although in elective cases (69.6%), they were discontinued before the primary intervention according to our institutional recommendations. Hypertension (systolic blood pressure >160 mm Hg or lower if indicated) during the early postoperative period was present in 64.3% of all cases, whereas after craniotomies the rate was even higher (84.6%). Of patients with postoperative hypertension who underwent craniotomy, 81.8% received antihypertensive medications (labetalol, clonidine, or other) in the ICU. The incidence of laboratory disturbances possibly leading to hemorrhagic complications

Table 1. Baseline Characteristics			
	Craniotomies	Spinal Surgery	All Together
Demographics			
Male gender	10 (43.5)	17 (56.7)	27 (50.9)
Age (years), mean $\pm$ standard deviation	56 ± 20.8	63 ± 12.4	60 ± 17.0
Body mass index (kg/cm <sup>2</sup> ), mean $\pm$ standard deviation	25.7 ± 4.2	27.4 ± 4.0	26.6 ± 4.2
Underlying diseases			
Ischemic heart disease	2 (8.7)	3 (9.4)	5 (9.4)
Hypertension	9 (39.1)	14 (46.7)	23 (43.4)
Diabetes	3 (13.0)	5 (16.7)	8 (15.1)
Renal insufficiency	1 (4.3)	3 (9.4)	4 (7.5)
Liver insufficiency	0 (0)	1 (3.1)	1 (1.9)
Previous surgery	NR	8 (26.7)	NR
Emergency admission	13 (50.0)	4 (13.3)	17 (30.4)
Values are number (%) except where indicated otherwise.			

Download English Version:

# https://daneshyari.com/en/article/5633796

Download Persian Version:

https://daneshyari.com/article/5633796

Daneshyari.com