



Clinically Diagnosed Postoperative Venous Thromboembolism in a Neurosurgery Practice in Nigeria

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■ **INTRODUCTION:** Postoperative venous thromboembolism (VTE) is a major surgical complication, fraught with high case fatality rate, to which neurosurgical patients are particularly prone. There is dearth of data on this problem in the neurosurgical literature from sub-Saharan Africa.

■ **MATERIALS AND METHODS:** A 6-year prospective descriptive study of postoperative VTE in a neurosurgeon's clinical practice in Nigeria is hereby presented. The clinical case of a fatal, postmortem-confirmed post craniotomy VTE also is annotated.

■ **RESULTS:** There were 10 cases of clinically diagnosed neurosurgical postoperative VTE, representing 2.4% of the surgical patients population. The cases were diagnosed from clinical impressions supplemented with laboratory investigations like the Doppler ultrasonography with B-mode imaging of the deep veins of the lower extremities, and chest computed tomographic angiography. Six of these 10 cases died, a case fatality rate of 60%. Meningiomas were the intracranial tumours operated on in 60% of the cases.

■ **CONCLUSIONS:** Postoperative venous thromboembolism has a very high case fatality rate among these neurosurgical patients. There is need for continuing surveillance of this problem, as well as a heightened vigilance to prevent and treat it in our neurosurgical patient populations.

INTRODUCTION

Venous thromboembolism (VTE), including lower extremity deep-vein thrombosis (DVT) and pulmonary embolism (PE), is a devastating postoperative complication with high rate of case fatality. Postoperatively, neurosurgical patients among all other in-hospital surgical cohorts are particularly prone to the complication, partly as the result of perioperative (pre- and post-operative) immobility that many neurologic illnesses predispose patients to, the long hours of surgery involved in many neurosurgical operative procedures, and the intrinsic biology of some neurosurgical lesions, including brain tumors like meningiomas, that appears to promote thrombogenesis.¹⁻³

It has therefore been opined that the neurosurgeon has 3 practical problems regarding the issue of VTE: preventing DVT, diagnosing it, and treating it.³ Hence, several scientific studies and reviews from the developed countries show increasing efforts by neurosurgery units to address postoperative VTE along these 3-pronged directions, either singly or in combination.³⁻⁸ In contrast, it appears that only scant attention, if any, is paid to this problem in the less-developed parts of the world. We are aware of only 1 report on the subject of postoperative VTE in contemporary literature from our region,⁹ but even this was only a questionnaire-based survey of practice of thromboprophylaxis among select surgeons. The report showed low awareness of the use of thromboprophylaxis among the study subjects.⁹ Thus, there appears to be no existing easily accessible literature in sub-Saharan Africa on the burden of postoperative VTE.

Sometime in the year 2009, a fatal, postmortem-confirmed VTE marked the unheralded catastrophic end to an otherwise-successful

Key words

- Deep-vein thrombosis
- Developing country
- Neurosurgery
- Postoperative
- Pulmonary embolism
- Venous thromboembolism

Abbreviations and Acronyms

- CT:** Computed tomography
- CTA:** Computed tomographic angiography
- Doppler USS:** Doppler ultrasound scan with B-mode imaging
- DVT:** Deep-vein thrombosis
- ICU:** Intensive care unit
- IPC:** Intermittent pneumatic compression
- LMWH:** Low-molecular-weight heparins
- PE:** Pulmonary embolism

POD: Postoperative day

TED: Thromboembolic-deterrent stockings

VTE: Venous thromboembolism

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surgical resection of a cavernous sinus meningioma in our skull base surgery unit of a difficult practice setting in this region. One principle response this event elicited in our practice was a heightened vigilance to prevent this complication among our patient population and a prospective surveillance for its incidence. In this report a descriptive analysis of cases of VTE among a neurosurgical operative surgical cohort in this sub-Saharan African developing country is presented. The fatal index case also is illustrated.

MATERIALS AND METHODS

This is a 6-year prospective observational study that used the prospective, consecutive database of the clinical records of all the patients who underwent neurosurgical operations, spinal or cranial, in the principal author's practice since the year 2009. The clinical records of all neurosurgical operative cases in which there was clinical evidence in keeping with VTE, with or without laboratory confirmation, were captured in clinical summary forms.

In this report, the clinical summary of 1 fatal case whose clinical suspicion was confirmed on necropsy is presented in addition to a descriptive analysis of all the other cases seen between the year 2009 and 2015 in our operative surgical experience. Data analyzed include each patient's age, sex, and clinical diagnosis; presumed clinical predisposition to VTE, including duration of surgery, and presence of perioperative reduced mobility; the time duration from surgery to clinical suspicion of the VTE, as well as the means of confirming the diagnosis; the treatment offered, outcome of treatment (death or survival), and the follow-up duration for the survivors.

RESULTS

Case Illustration

A 43-year-old woman presented with a 3-year history of progressive blurring of vision that became total 6 months before our review. There was associated history of recurrent headache, galactorrhea of 3 years' duration, and amenorrhea of 1-year duration. Clinical examination revealed a young woman with normal mental status. She was blind bilaterally, visual acuity being nil light perception on the right side and hand movement on the left. Both pupils were 4 mm in diameter, nonreacting, and showed relative afferent pupillary defect. Fundoscopy revealed bilateral optic atrophy. There was subtle bilateral abducens nerve palsy and galactorrhea. Her vital signs were normal.

Cranial computed tomography (CT) scanning showed a huge sellar/parasellar mass, brilliantly contrast enhanced with calcific deposits (Figure 1A). Cranial magnetic resonance imaging showed a bilobed frontobasal contrast-enhanced isointense mass involving the tuberculum-planum area with involvement of the sellar/suprasellar cisterns and cavernous sinus bilaterally. The posterior extension encircled the basilar artery by approximately 50%. The diagnosis of a cavernous sinus meningioma was made.

Gross total tumor excision of the cavernous sinus tumor was achieved via a right fronto-orbito-zygomatic craniotomy with a right anterior extradural clinodectomy. Intraoperative findings were that of a huge suprasellar mass with extension into the cavernous sinus; it was grayish white, well-encapsulated, fibrous, and moderately vascular. The optic nerves were plastered to the

tumor and stretched into mere ribbons. Both carotid arteries were exposed. Operative time was 6 hours. Cranial CT scanning 24 hours postoperatively showed evidence of total tumor excision with no significant tumor bed hemorrhage (Figure 1B). The histology was reported as transitional meningioma, World Health Organization Grade I.

The immediate postoperative period was uneventful. The patient was ambulated on the morning after the operation and discharged from the intensive care unit (ICU) the second postoperative day (POD). The Glasgow Coma Scale score remained 15; both pupils were 4 mm each and nonreacting. Her clinical condition had remained stable, with only occasional periods of subtle confusion, and she continued to ambulate with only minimal support as a result of her blindness. She was being prepared for discharge from the hospital on POD 11. On the evening of the POD 12, she complained of being weak although was otherwise clinically stable. Attention was, however, drawn to her in the early hours of POD 13 when she was observed to be gasping. She went into cardiopulmonary arrest from which she could not be resuscitated.

The clinical suspicion was that of a fatal VTE. A postmortem examination was requested, which revealed no clinically significant intracranial findings but a bilateral saddle embolism in the pulmonary arterial vasculature (Figure 2).

Clinical Series

Nine other clinically diagnosed cases of VTE were recorded, making 10 in all, of a total of 422 (2.4%) patients who underwent major operative neurosurgery care, cranial and spinal, in the principal neurosurgeon's practice in the study period. Further clinical details of these neurosurgical postoperative cases of VTE are shown in Table 1. Seven were female, and 3 were male. The median age was 50 years (range, 41–70).

Intracranial meningioma occurred in 6 cases; giant pituitary adenoma (≥ 5 cm), brain metastasis (colorectal primary disease with previous hospital presentation with DVT), traumatic brain injury, and cervical syringomyelia¹⁰ occurred in 1 case each. The duration of surgery ranged between 1.67 and 6.00 hours, with median of 3.38; 7 of the cases lasted ≤ 4 hours. Apart from the moderately long hours of the surgery, 3.50 hours, case 5 (Table 1) did not have any other apparent clinical predisposition to the postoperative development of VTE: there was no perioperative reduced mobility, and the patient was mobilized out of bed on the first POD. The rest of the cases had prolonged reduced mobility in the perioperative (especially preoperative) period.

Case number 3 presented primarily in the hospital with clinical and Doppler ultrasound scan with B-mode imaging (Doppler USS)-diagnosed DVT complicating an anorectal carcinoma. There was associated neurologic deficit from associated brain metastasis. The DVT was managed successfully with chemical anticoagulation; serial Doppler USS showed clots lysis. She underwent an awake craniotomy lasting only 3 hours to resect the brain deposit, did well, and then had abdominal surgical exploration to address the primary lesion. VTE recurred, and she died on POD 5 after the laparotomy, or POD 36 after the craniotomy.

On 2 specific occasions, cases 2 and 6, the clinical diagnosis of the VTE was confirmed, antemortem, with bilateral lower-limb Doppler USS with B-mode imaging and chest computed

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