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Podcast

Acute subdural haemorrhage in a warfarin user following leech bite: Clinical note and review

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In patients taking vitamin K antagonists (VKAs), the annual rate of intracranial haemorrhage (ICH) ranges from 0.3% to 0.6% with a reported mortality rate of approximately 44%-60%.[1,2] Haemorrhage into the brain parenchyma (intracerebral haemorrhage) is the most common location (46% to 86%) followed by subdural (13% to 45%) and subarachnoid haemorrhage (1% to 8%).[3] Multiple medications and dietary factors interact with warfarin action and might interfere with its efficacy or safety. We are describing a unique case of ICH which occurred following leech bite while taking warfarin for prevention of recurrent venous thromboembolism (VTE).

A 59-year-old man, who initially presented to a hospital in rural Ontario, Canada, with a three-day history of headache associated with progressively worsening expressive speech difficulty. His neurological examination was notable for motor (Broca's) aphasia without other focal motor or sensory deficits. His National Institutes of Health Stroke Scale (NIHSS) at admission was 7. His head computed tomography (CT) showed acute left subdural haemorrhage (SDH) associated with midline shift (Figure 1A). His medical history was significant for an unprovoked left leg deep venous thrombosis (DVT) and pulmonary embolism (PE) in 12 years ago and a recurrence of DVT 10 years ago. He was on chronic anticoagulation with warfarin. He had stable international normalized ratio (INR) within therapeutic window for many years.

Patient recalled that several hours prior to his initial symptoms, he was at a beach and was bitten by multiple leeches on the right foot.

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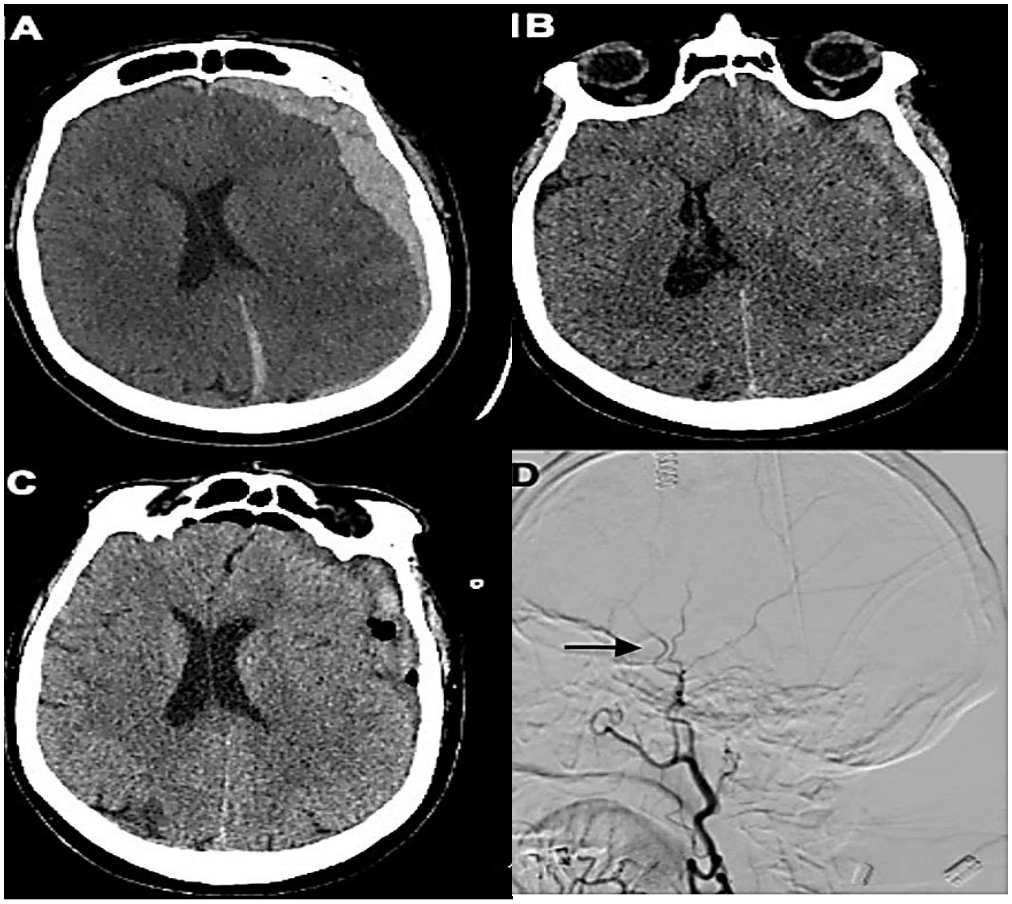

Figure 1. A) Axial head computed tomography (CT) scan showing left subdural haemorrhage (SDH) with midline shift; B) Subacute SDH with increased midline shift; C) Post hematoma evacuation head CT; D) Lateral digital subtraction angiography image showing external cerebral artery and its branches including middle meningeal artery (MMA) (black arrow)

He had significant bleeding at bite site. Few hours later he developed headache. His INR at the time of admission (three days after leech bite) was 3.1. He was treated with prothrombin complex concentrate (PCC, Octaplex) and parenteral vitamin K, and did not require surgical intervention. He recovered over next week (NIHSS = 0) and was discharged home. He received DVT prophylaxis during the hospital stay, which was discontinued at the time of discharge with a plan to reinitiate anticoagulation after 4-6 weeks.

Unfortunately, a week after his discharge, he was readmitted with a reduced level of consciousness. He was also diagnosed with bilateral lower limb DVT and extensive PE. His head CT showed increased midline shift (Figure 1B). His SDH was evacuated with the burr hole followed by middle meningeal artery (MMA) embolization to reduced SDH recurrence risk (Figure 1C and 1D). After confirming stability of SDH, anticoagulation was resumed 48 hours after the embolization. He made an excellent recovery after surgical and endovascular intervention and was eventually discharged home on apixaban. His NIHSS and Modified Rankin Scale (mRS) was 0 at the time of discharge and remained well at 3-month follow-up.

ICH is the most sinister complication of oral anticoagulation with high mortality. Various factors are known to be associated with the risk of VKA's related ICH including advancing age, race, sex, presence of amyloid angiopathy, uncontrolled hypertension (HTN), diabetes, previous ischemic stroke, and intensity of anticoagulation.[4] In addition, various medications and dietary factors could affect efficacy or safety of the VKA therapy. The association of leech bite with ICH while being on stable oral anticoagulation with VKA has not been reported.

We think leech contributed to the ICH in our patient. First, patient has been free of any bleeding complications despite over a decade of VKA therapy. His INR has been carefully monitored and

was stable for years. He has been on stable doses of warfarin with no recent illness, trauma, medication, or diet change. The leech bite temporally antedated the initial symptoms of ICH. Leech is known to possess potent anticoagulant hirudin, a direct thrombin inhibitor; therefore, it can synergize VKA effect.

Our literature search revealed only few reported cases of systemic bleeding following leech bite and only one instance of SDH as a complication of medicinal leech therapy; however, patient was not taking oral anticoagulation.[5] Leech saliva contains numerous bioactive substances including hirudin (potent antithrombin), hyaluronidase, histamine-like vasodilator, calin (a platelet aggregation inhibitor), lefaxin (factor Xa inhibitors), theromacin (antibacterial), acetylcholine, collagenase, and many others. These substances are secreted locally at bite site but can have systemic effects. An adult leech can ingest 1 milliliter per minute of blood, and the area of attachment can bleed for 10 hours to as long as 7 days in some instances. Literature suggests that prothrombin time (PT) and activated partial thromboplastin time (aPTT) can remain elevated after leech bite.[6] Our patient presented in a delayed fashion, which likely contributed to near therapeutic levels of INR at the time of admission. A leech bite can be diagnosed based on patient history and examination (which might show bite marks). Initial treatment includes removal of the leech (es) and controlling local bleeding from the bite site. For patients experiencing systemic bleeding complications, the treatment is supportive and there is no specific antidote. Use of tranexamic acid and blood products has been described in the literature.[6,7]

Resuming anticoagulation after the ICH is supported by limited data. Decision to restart depends on an individual's risk of recurrent ICH versus risk of thrombosis/thromboembolism. Other factors include choice of anticoagulant, controlling risk factors for bleeding, and control of bleeding source. Overall data support resumption of anticoagulation after 4 weeks, except in cases with a high risk of recurrent thromboembolism where anticoagulation can be initiated at 2 weeks or earlier. We were able to resume anticoagulation after embolization of MMA. We also preferred direct oral anticoagulants (DOACs) over warfarin as DOACs have less risk of ICH compared to warfarin.[8]

Health professionals working in rural areas where leech infestation is common should be aware of rare risk of leech bite associated systemic bleeding manifestations. This might also be relevant in regions where medical leech therapy (hirudotherapy) is prevalent. Leech bite should remain among a possibility in patient who has unexplained bleeding while on stable anticoagulation. A high index of suspicion is required in making an early diagnosis and prompt treatment if required. Moreover, education regarding preventing leech bite and precautions regarding the safety of water (boiling, applying chloride, filtering, etc.) should be encouraged and carried out in leech-endemic areas or while visiting these areas.

Conflict of Interests

The authors declare no conflict of interest in this study.

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