


# Ischemic stroke and floating thrombosis in dissection of the common carotid artery in patient at third week of pregnancy: Surgical technical success and maintenance of pregnancy

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## Abstract

Thrombosis, especially in pregnancy, is due to a prothrombotic state and involves the venous system. Localization in an arterial segment is rare. Floating carotid arterial thrombosis is a very rare occurrence, but it is very devastating. The authors report the case of a pregnant patient in whom are associated a thrombotic predisposition and a traumatic event of the neck which resulted in a limited dissection and a floating thrombosis of the common carotid artery. The onset was characterized by sudden neurological deficits, including numbness of the right-hand fingers and right limb weakness, which regressed after admission. The patient underwent a surgical operation with success. Her pregnancy continued, and an ultrasound scan 12 months later confirmed the patency of the prosthesis, in the absence of neurological symptoms. Hormonal changes may reveal the condition of thrombophilia, which, however, occurs more frequently in the venous system and is a condition related to the free-floating thrombus. No guidelines exist for medical or surgical management. The endovascular approach appears to present a greater risk of embolization as an alternative to open surgery. This case demonstrates that the prothrombotic state and the presence of neurological symptoms are suggestive of arterial thrombosis in pregnancy and that the multidisciplinary approach is mandatory to achieve good results.

## Keywords

Surgery, obstetrics/gynecology, critical care/emergency medicine/vascular surgery

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## Introduction

An ischemic stroke, considered as a disorder of cerebral activity, could be associated with an ischemic lesion or result from the interruption or occlusion of a blood vessel. It is a debilitating occurrence for everyone, especially for a woman who is pregnant because of the long-term effects of this event on herself.<sup>1</sup> Standardization of protocols for medical or surgical techniques in these cases, however, may be difficult due to the event's rarity and to varying patient characteristics. Endovascular treatment has potential disadvantages which include vascular injury at the site of intervention, distal clot fragmentation, an induced increase in blood–brain barrier permeability, lack of expertise, and use of contrast agents. The use of ionizing radiation, necessary for endovascular procedures in pregnant women, involves the risks of teratogenicity for the

fetus. The application of a stent in the vascular system requires the use of a dual antiplatelet therapy that can increase the risk of bleeding during childbirth.<sup>2</sup> We report the challenging case

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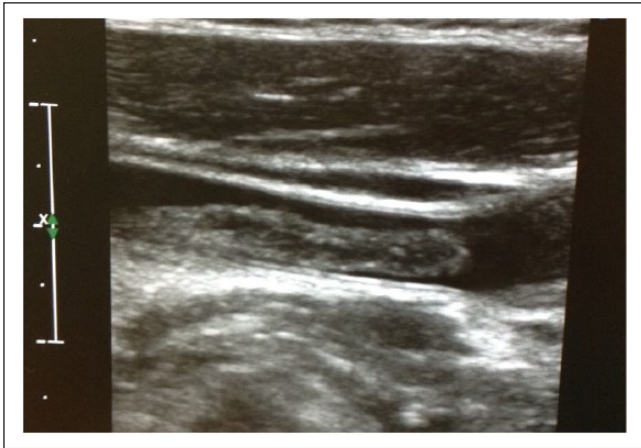
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**Figure 1.** Echo Doppler showing floating thrombus: in the left side notes the site of implantation of the thrombus and discontinuity of the intima, suggesting dissection of the artery.

of a pregnant woman with an ischemic stroke caused by thromboembolism from a floating thrombus in the common carotid artery. The patient was treated with heparin infusion followed by a surgical operation associated with interposition of a 6-mm knitted Dacron prosthesis.

### Case report

The clinical onset for our patient, 34 years old, was characterized by sudden neurological deficits, including numbness of the right-hand fingers and right limb weakness, which regressed after admission. The patient reported nicotine abuse (1 pack/die) and a recent left side cervical trauma caused by beatings. In the emergency room of our hospital, a blood test revealed she was at the third week of pregnancy. Blood and coagulation tests and thrombophilia were found in the norm except fibrinogen which was 651.70 mg/dL. The patient had a brain magnetic resonance imaging (MRI) which showed ischemic areas in the left parietal lobe due to embolization. An ultrasound examination of the neck vessels after the MRI showed a floating thrombosis 3 cm in length, originating in the left common carotid vessel; we also found a sort of small tear at the level of the intima (Figure 1). Therapy with systemic heparin 25,000 UI/24 h was promptly established and, after a joint evaluation by the neurologist, gynecologist, and vascular surgeon, a surgical resection of the common carotid artery involved in the dissection and thrombosis was planned and performed in association with the interposition of a 6-mm knitted Dacron artery prosthesis (Figures 2–4). The operation was performed under general anesthesia with continuous electroencephalogram (EEG) monitoring. After the surgery was done only low molecular weight heparin (LMWH) for deep vein thrombosis (DVT) prevention for 4 days. There were no complications during the postoperative course. A vascular ultra-sound examination documented the Dacron graft patency. Postoperative physical examination of the

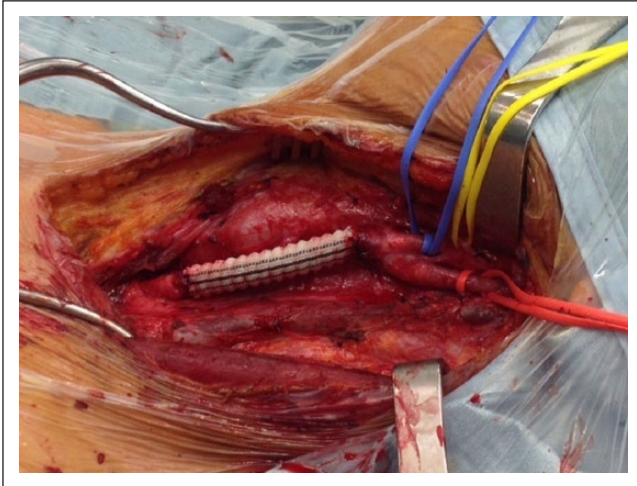


**Figure 2.** Intraoperative finding: intima disruption at the point of origin of the thrombus.



**Figure 3.** Intraoperative specimen: thrombus after removal.

patient confirmed continued regression of the symptoms. The beta human chorionic gonadotropin ( $\beta$ hCG) showed no decrease in their levels, thereby demonstrating continuation of the pregnancy. A postoperative transvaginal ultrasonography examination of the pelvis was performed (Figure 5), which documented an eumorphic gestational room in a normo system with only one live embryo, normal cardiac activity (M-mode), and motor patterns. Crown-rump length was 19 mm, attesting the current gestational age in relation to the time of amenorrhea. Even though the patient was treated successfully, without any neurologic deficits, the pregnancy was voluntarily interrupted 30 days after the operation. The 1-year follow-up showed patency of the prosthesis and normal findings for the common, internal and external carotid artery at the echo color Doppler examination, and antiplatelet therapy for life was advised. A new pregnancy has not been planned.



**Figure 4.** Intraoperative findings: interposition of a 6-mm Dacron left common carotid prosthesis.



**Figure 5.** Eumorphic gestational room in a normo system with only one live embryo.

## Discussion

To the best of our knowledge, there are no previously reported cases of stroke caused by intraluminal damage at the beginning of pregnancy, diagnosed and treated with surgery, as in our experience. Pregnancy is characterized by hormonal changes that may reveal the condition of thrombophilia, which occurs more frequently in the venous system<sup>3</sup> but can also occur in the arterial system. In fact, Bushnell et al. report that pregnancy is a condition related to arterial strokes (34 strokes per 100,000 deliveries), because the risk is higher in pregnant than in non-pregnant young women (21 per 100,000), with the stroke occurring, however, in the third trimester and postpartum.<sup>4,5</sup> Tan et al. reported a recent case of carotid artery thrombosis in a 46-year-old patient with an acute embolic stroke, characterized by sudden onset of left-hand weakness. This

condition brought to mind an episode of sore throat with painful right-side cervical lymphadenopathy, 2 weeks before the onset of the left-hand weakness, which was relieved by an intense circular motion massage on the right side of the neck; the subject was a male patient with no family history of cerebrovascular disease or atherosclerotic risk factors.<sup>6</sup> In a recent series of urgent treatment for free-floating thrombus, only 4/16 patients were female and none in a gestational condition.<sup>7</sup> The literature also reports dissection of the common carotid artery, even caused by minor trauma compared to the one described by us.<sup>8</sup> In our case, the history of smoking, as a risk factor for atherosclerosis, may play a role in the intima alteration. It was not possible to prove a direct correlation with the neck injury due to the reported beatings; however, this may have played a major role as a contributory cause. The preoperative image study was limited to cerebral magnetic resonance (MR) and echography, so as to reduce potential complications due to catheter angiography/digital subtraction angiography that can expose the fetus to substantial radiation and should be used with caution.<sup>2</sup> Although medical treatment has been described in similar cases, a medical and surgical strategy with heparin and a surgical operation were adopted in our case based on our experience with floating thrombus and the evidence reported in the literature.<sup>8-11</sup> The endovascular approach, in our opinion, represents an additional risk of embolization and is a potentially perilous alternative to open surgery. Finally, a very important role in the successful treatment of the patient was played by the multidisciplinary process, inasmuch as the special characteristics of this case demanded the input of multiple skills.

## Conclusion

Pregnancy is already per se a prothrombotic state, and the intrinsic risk factors triggered by the gestational state may be present. Carotid arterial thrombosis is a rare but potentially fatal occurrence, which should always be suspected, diagnosed, and treated promptly, as in our multidisciplinary approach.

## Declaration of conflicting interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

## Ethics approval

Our institution does not require ethical approval for reporting individual cases or case series.

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## Informed consent

Written informed consent was obtained from the patient(s) for their anonymized information to be published in this article.



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