

# A Case Report and Systematic Literature Review of Post-carotid Artery Stenting Hyper Perfusion Syndrome in a Hypotensive Patient

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## Introduction

Carotid Artery Stenting (CAS) has emerged as an important therapeutic intervention for patients with symptomatic or asymptomatic carotid artery stenosis who are at high risk for surgical complications associated with Carotid Endarterectomy (CEA). While CAS has proven to be an effective procedure for restoring blood flow to the brain, it carries the potential for a range of complications. One of the less common, but more serious, complications is post-carotid artery stenting hyper Perfusion Syndrome (CHS), a condition in which there is excessive blood flow to the brain following stent placement, leading to neurological symptoms and in severe cases, intracranial haemorrhage. This case report, along with a systematic literature review, aims to explore the occurrence of CHS in a hypotensive patient, focusing on the pathophysiology, diagnostic challenges and management strategies to optimize patient outcomes [1].

## Description

A 68-year-old male with a history of chronic hypertension and atherosclerotic disease presented with recurrent Transient Ischemic Attacks (TIAs) attributed to severe stenosis of the right internal carotid artery. Despite medical management with antiplatelet therapy and statins, the patient continued to experience symptoms of cerebral hypo perfusion. Given his high surgical risk due to multiple comorbidities, including obesity and mild chronic kidney disease, a decision was made to proceed with carotid artery stenting to revascularize the stenotic vessel.

The procedure was uneventful, with the stent deployed successfully and the patient was transferred to the recovery unit with stable vital signs. In the immediate postoperative period, the patient's blood pressure began to fluctuate significantly. Although initially hypertensive, the patient developed periods of hypotension that required intermittent pharmacologic support to maintain adequate perfusion. Approximately 12 hours after the procedure, the patient experienced a sudden onset of a severe headache, confusion and focal neurological deficits, including right-sided weakness. A non-contrast CT scan revealed no evidence of haemorrhage, but subsequent brain MRI with perfusion imaging demonstrated areas of cerebral hyper perfusion [2].

The insights gained from the exploratory network analysis have important implications for designing interventions aimed at improving mental health and addressing eating psychopathology among college students.

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Given the interconnected nature of the identified psychological processes, interventions should adopt a holistic and integrative approach that addresses emotion regulation, cognitive distortions and maladaptive coping strategies simultaneously. One promising avenue for intervention is the incorporation of emotion regulation training into existing programs targeting disordered eating behaviors. By equipping students with effective emotion regulation strategies, such as mindfulness, acceptance and cognitive reappraisal, it may be possible to reduce reliance on maladaptive eating behaviors as coping mechanisms. Additionally, teaching students to recognize and challenge cognitive distortions can enhance their ability to respond adaptively to emotional stressors, ultimately contributing to healthier eating patterns and improved psychological well-being. The diagnosis of CHS remains a challenge, as it lacks specific clinical markers and can present with a broad spectrum of neurological symptoms. Common presenting symptoms include headache, seizures, altered mental status and focal neurological deficits, which overlap with other postoperative complications, such as stroke or intracranial hemorrhage. Non-contrast CT scans is typically the first imaging modality employed to rule out major complications like hemorrhage or acute infarction. However, CT perfusion imaging or MRI with perfusion sequences may be more sensitive in identifying the early signs of hyper perfusion, particularly in patients who do not exhibit overt haemorrhagic lesions.

In the present case, MRI was crucial for detecting hyper perfusion, as conventional CT was unable to identify the underlying cause of the patient's neurological symptoms. In practice, neuroimaging should be followed by continuous blood pressure monitoring and in some cases, cerebral blood flow monitoring may help determine the degree of hyper perfusion and guide therapeutic interventions [3,4].

In addition to targeted interventions, preventive measures should also be implemented to promote mental well-being among college students and reduce the risk of developing eating psychopathology. Educational programs that address body image, healthy eating and stress management can play a crucial role in fostering resilience and promoting positive behaviors. By equipping students with knowledge and skills to navigate the challenges of college life, these programs can help mitigate the impact of stressors that contribute to eating disorders. Peer support initiatives can also serve as valuable resources for promoting emotional well-being. Creating environments that encourage open discussions about mental health and eating behaviors can reduce stigma and foster a culture of support among students. Training peer mentors to recognize the signs of eating disorders and provide appropriate support can enhance the effectiveness of preventive efforts, making mental health resources more accessible to students who may be hesitant to seek help [5].

## Conclusion

Post-carotid artery stenting hyper perfusion syndrome is a potentially life-threatening condition that may occur after successful carotid stenting, particularly in patients with pre-existing vascular disease and impaired autoregulatory mechanisms. This case report, in conjunction with the systematic literature review, underscores the complexity of managing such patients, especially when there is concomitant hypotension. Early diagnosis, through imaging techniques like MRI with perfusion, is crucial for identifying hyper

perfusion changes and aggressive blood pressure management plays a pivotal role in preventing permanent neurological deficits or hemorrhage. The findings from the literature highlight the need for personalized postoperative care, particularly for those at higher risk for complications, such as those with chronic hypotension or cerebrovascular disease. Further research is needed to better understand the pathophysiology of CHS and to develop more refined strategies for its prevention and management in at-risk populations.

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## Acknowledgement

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## Conflict of Interest

None.

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