Case Report: Carotid Sinus Hypersensitivity During Internal Jugular Venous Cannulation

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Abstract: Carotid sinus hypersensitivity is common in elderly patients. Baroreceptor function generally decreases with age but some people experience hypersensitive carotid baroreflexes. In such individuals, even mild stimulation to the neck results in profound bradycardia and hypotension. In this case, CSH was elicited during internal jugular venous cannulation which is a common procedure in cardiac surgery. Knowledge about CSH can help us to take appropriate precautions in perioperative period and manage cardiac instability arising from this reflex.

Keywords: Carotid sinus hypersensitivity, baroreceptor, bradycardia, hypotension, internal jugular vein, syncope, atrio-ventricular pacing.

INTRODUCTION

Carotid sinus hypersensitivity syndrome is an overlooked cause of hypotensive-bradycardiac event particularly in the elderly, which is one of the major concerns to anaesthesiologist. Internal jugular venous cannulation is a common procedure in cardiac surgery. Elicitation of carotid sinus reflex can occur during the procedure and perioperative manipulations. Knowledge about CSH can help us to take appropriate precautions in perioperative period and manage cardiac instability arising from this reflex. To our best knowledge, carotid sinus hypersensitivity during IJV cannulation has not been reported in anaesthesia related literatures.

CASE HISTORY

55 years old female patient diagnosed as atrial septal defect was scheduled for surgical defect closure. After smooth and controlled induction, patients heart rate was 84/ minute with regular rhythm and invasive arterial blood pressure was 136 / 74 mm Hg. For central line insertion, patient's neck was turned to left side and right internal jugular vein area was prepared. As patients neck was short, internal jugular vein was punctured while palpating internal carotid artery on medial side. During the procedure, patient had severe bradycardia and hypotension lasting more than 5 seconds - heart rate was 42/minute and systolic blood pressure was 70 mm Hg. Atropine 0.6 mg was given intravenous immediately and patient recovered heart rate and pressure. Patient denied any history suggestive of syncopal episodes or falls. This case represents carotid sinus hypersensitivity (CSH) syndrome.

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DISCUSSION

Baroreceptor function generally decreases with age but some people experience hypersensitive carotid baroreflexes. In such individuals, even mild stimulation to the neck results in profound bradycardia and hypotension. CSH predominantly affects elderly males.

The carotid sinus reflex plays important role in blood pressure regulation. The carotid sinus is a dilated portion of the internal carotid artery at the level of the carotid artery bifurcation. Changes in stretch and transmural pressure are sensed by baroreceptors in the carotid sinus. Afferent impulses travels mainly through the glossopharyngeal nerve and synapse in the nucleus of the tractus solitarius. The efferent limb of the reflex goes to the sympathetic nerves supplying the heart and vasculature and the cardiac vagus nerve [1]. Sensory nerve endings in the walls of the sinus react to deformation - a rise in afferent impulse producing sympathoinhibition along with increase in efferent vagal activity resulting in fall in blood pressure and heart rate [2].

Nathanson [3] highlighted the distinction between Carotid Sinus Hypersensitivity (i.e. a positive carotid massage test) and Carotid Sinus Syndrome (i.e. syncopal episode triggered by typical manoeuvres in daily life such as shaving, head turning etc.). CSS is an underdiagnosed cause of falls and syncope in the old people. Elderly patients with this condition may deny history of syncopal episodes and present with recurrent unexplained falls [4].

In CSH, mechanical deformation of the carotid sinus leads to an exaggerated response with bradycardia or vasodilatation, resulting in syncopal episodes or dizziness. CSH is observed in up to 45% of old patients

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with syncopal episodes that may not be attributed to specific myocardial sinus node dysfunction or any disease affecting pacemaker activity, cardiac output and blood supply to the brain [5].

Carotid sinus hypersensitivity can be of 3 types [6].

The cardioinhibitory (70-75%) - The major feature is bradycardia or asystole due to vagal action on sinus and atrioventricular nodes. This response can be abolished with atropine.

The vasodepressor type (5-10%) - The predominant feature is a vasomotor tone decrease without a change in heart rate. This response is not abolished with atropine.

The mixed type (20-25%) - A decrease in heart rate and vasomotor tone occurs.

European guidelines have defined cardioinhibitory CSH as asystole of 3 seconds or more with a drop in SBP of less than 50 mm Hg. Vasodepressor CSH was defined as a drop of 50 mm Hg or more in SBP and mixed CSH was a combination of cardioinhibitory CSH and vasodepressor CSH [6].

Two cases of asystolic cardiac arrest from CSH, triggered by positioning for head and neck surgery have been reported in the literature of anaesthesia [7, 8]. Perioperative implications of CSH are that these patients are volume sensitive, reflex can be exaggerated in hypovolemia. Hematoma at puncture site and sonographic probe during USG guided cannulation also can stimulate carotid sinus receptor. Even application of compression sticking over the insertion point of central line after its removal can provoke the reflex in the postoperative period and cause syncopal episode. For symptomatic cardioinhibition, atrio-ventricular pacing is advised [9, 10]. Atrial pacing alone is not preferred due to high incidence of atrioventricular block during baroreflex stimulation [9]. Similarly, ventricular pacing alone may prevent cardioinhibition but fails to relieve symptoms in a significant number of patients as it can lead to aggravation of coexisting vasodepression or the development of pacemaker syndrome [11]. Patient should be made aware of the CSH and precipitating events like wearing tight neck collar and sudden rotating neck movements should be avoided. Patient should be aware of prodromal symptoms like presyncope or syncope. In such situations, immediately taking supine position is recommended to avoid syncope or fall. Elicitation of this reflex should be mentioned in anaesthesia record which would be useful for the anaesthesiologist to take precautions in the future.

CONCLUSION

Carotid sinus hypersensitivity is common in elderly patients but still underdiagnosed cause of dizziness and falls. Its recognition is important in the perioperative period to manage cardiac instability arising from this reflex.

REFERENCES

[1] Strasberg B, Sagie A, Erdman S, Kusniec J, Sclarovsky S, Agmon J. Carotid sinus hypersensitivity and the carotid sinus syndrome. Prog Cardiovasc Dis 1989; 31: 379-91. http://dx.doi.org/10.1016/0033-0620(89)90032-7

[2] Thomas JE. Diseases of the carotid sinus - syncope. In: Vinken PJ, Bruyn GW, eds. Handbook ofClinical Neurology, vol 11, chap 19. Amsterdam: North Holland Publishing 1972: 532-51.

[3] Nathanson MH. Hyperactive cardioinhibitory carotid sinus reflex. Arch Intern Med 1946; 77: 491-503. http://dx.doi.org/10.1001/archinte.1946.00210400016002

[4] McIntosh SJ, Lawson J, Kenny RA. Clinical characteristics of vasodepressor, cardioinhibitory, and mixed carotid sinus syndrome in the elderly. Am J Med 1993; 95(2): 203-8. http://dx.doi.org/10.1016/0002-9343(93)90261-M

[5] O'Mahony D. Pathophysiology of carotid sinus hypersensitivity in elderly patients. Lancet 1995; 346(8980): 950-2. http://dx.doi.org/10.1016/S0140-6736(95)91563-X

[6] Brignole M, Alboni P, Benditt DG, *et al*. Guidelines on management (diagnosis and treatment) of syncope-update 2004: executive summary. Eur Heart J 2004; 252054-2072.

[7] Chung HS, Park CM, Kim ES, Ghil BG, Park CS. Temporary cardiac arrest in patient under robotically assisted total thyroidectomy causing carotid sinus hypersensitivity -A case report-. Korean J Anesthesiol 2010; 59(Suppl): S137-40. http://dx.doi.org/10.4097/kjae.2010.59.S.S137

[8] Truong AT, Sturgis EM, Rozner MA, Truong DT. Recurrent episodes of asystole from carotid sinus hypersensitivity triggered by positioning for head and neck surgery. Head Neck 2011; [Epub ahead of print].

[9] Morley CA, Sutton R. Carotid sinus syncope [Editorial]. Int J Cardiol 1984; 6: 287-93. http://dx.doi.org/10.1016/0167-5273(84)90188-8

[10] Brignole M, Menozzi C, Lolli G, Bottoni N, Gaggioli G. Longterm outcome of paced and nonpaced patients with severe carotid sinus syndrome. Am J Cardiol 1992; 69: 1039-43. http://dx.doi.org/10.1016/0002-9149(92)90860-2

[11] Morley CA, Perrins EJ, Grant P, Chan SL, McBrien DJ, Sutton R. Carotid sinus syncope treated by pacing. Analysis of persistent symptoms and role of atrioventricular sequential pacing. Br Heart J 1982; 47: 411-18. http://dx.doi.org/10.1136/hrt.47.5.411

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