

Dexmedetomidine induced catecholamine suppression in pheochromocytoma

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Abstract

Pheochromocytoma is a neuroendocrine tumour of chromaffin cells, though rare but a known cause of paroxysmal hypertension with a triad of headache, diaphoresis and palpitation. The biochemical diagnosis of pheochromocytoma is based on estimation of plasma nor-adrenaline, adrenaline and their metabolites in plasma or urine. Clonidine suppression test is performed to differentiate the raised catecholamine level due to pheochromocytoma or other than pheochromocytoma especially in cases where plasma nor-adrenaline levels are less than 2000 pg/ml. Clonidine is stated to be unable to suppress catecholamine level in cases of pheochromocytoma, therefore we tested the other α_2 -agonist Dexmedetomidine intravenous in a case of Pheochromocytoma with remarkably raised nor- adrenaline (25,183 pg/ml) and found 49.42% suppression.

Key words: Clonidine, dexmedetomidine, nor- adrenaline, pheochromocytoma, plasma adrenaline (Source: MeSH, NLM)

INTRODUCTION

Pheochromocytoma (pheo) is a chromaffin cell tumor, though rare but a known cause of paroxysmal hypertension in association of a triad of headache, diaphoresis and palpitation.^[1,2] Other than symptoms and clinical examination it can be diagnosed by various laboratory test viz, urinary catecholamine levels vanillylmandelic acid (VMA) and plasma adrenaline, nor- adrenaline, metanephrine, nor-metanephrine, but in few cases diagnosis is confirmed only after histopathological examination.^[3] Oral clonidine suppression test is performed to exclude essential hypertension to pheo induced hypertension in conditions where the catecholamine level are marginally elevated as clonidine is unable to reduce the catecholamine level raised due to pheo.^[4,5] We tested dexmedetomidine (dexmed) a more selective α_2 -agonist for catecholamine suppression in a case of pheo.

The study was aimed to see the suppression response of dexmed on raised catecholamine's and further use of drug to control peri-operative haemodynamic fluctuation.

CASE REPORT

This study was undertaken after ethical committee

approval and written consent from the patient. A 42-year-old man with history of anxiety, palpitation, occasional severe headache associated with vomiting, diagnosed as pheo, was planned for right adrenalectomy under anaesthesia. At the time of presentation his heart rate was 108/min, arterial pressures were 210/108 mmHg, 2-hours later only with injection midazolam 2 mg intravenous and rest, his arterial pressure came down to 170/98 mmHg, He had fluctuating arterial pressure as after attending the toilet, his arterial pressure again shot up to 200/106 mmHg. Patient's 24-hour urinary VMA was estimated and was found to be raised. His ultrasound followed by MRI scanning revealed a mass originating from right adrenal gland. On the basis of clinical features, presence of adrenal tumor and raised urinary VMA patient was diagnosed as right adrenal pheo. Patient was treated with phenoxybenzamine and prazosin. As clonidine is stated to be ineffective to reduce plasma catecholamine levels more than 30% and so the arterial pressure in pheo, we planned to observe the response of intravenous dexmed, the drug of same category for suppression of patient's catecholamine's in this case.

Testing method

All the medical treatment was withdrawn before the test and patient kept under strict medical observation especially for sudden episode of hypertension and

the test was performed in the morning. Patient lied supine and rested for 20-mins before measurement of basal arterial pressure nor-adrenaline heart rate and cannulation of median cubital vein for drawing blood samples. Arterial pressure and heart rate were measured at every 15-mins interval with an automated sphygmomanometer on multi-paramonitor. The venous blood samples drawn were labeled as A1 and A2 before and after administration of dexmed respectively. 6 ml of blood was collected on both time and each sample was sent in two different containers for estimation of plasma adrenaline and nor- adrenaline. Dexmed was prepared in a concentration of 2 µg/ml with normal saline. 60 µg (1 µg/kg) was infused over a period 10-mins using syringe infusion pump. Both the samples A1 and A2 were sent to laboratory (Super Religare laboratories ltd, Mumbai, India) for adrenaline and nor-adrenaline estimation in a blinded manner.

RESULTS

The basal estimation of sample A1 which was before administration of dexmed showed plasma adrenaline - 41.8 pg/ml (normal - <125 pg/ml) and nor-adrenaline - 25,183 pg/ml (normal - <600 pg/ml) suggested a nor-adrenaline secreting tumor. Sample A2 which was taken after dexmed showed almost unchanged plasma adrenaline - (42.1 pg/ml) but a remarkably reduced level of nor-adrenaline - (12,736 pg/ml) i.e. 49.42% suppression of nor-adrenaline.

DISCUSSION

Pheochromocytomas account for less than 0.1% of all cases of hypertension in adult.^[6-8] Although they are an uncommon cause of hypertension, their detection is imperative since they are potentially lethal and one of the few truly curable forms of hypertension.^[9] It can be diagnosed easily by the presence of adrenal tumour, clinical features, raised catecholamine and there metabolites^[10] in plasma and urine but the diagnosis becomes equivocal when catecholamine levels are marginally raised. Clonidine suppression test is advocated in such conditions as clonidine can suppress raised catecholamine levels in case of non-pheo induced hypertension but it fails to suppress raised catecholamine levels due to pheo.^[6] Dexmed, 7 to 10 times more potent α_2 -agonist than clonidine was tested in our case of pheo to study its response on catecholamine levels.^[11] The tumor was highly nor-adrenaline secreting but plasma adrenaline level was normal. Dexmed was found very

effective in suppressing nor-adrenaline level (49.42%). In the majority of patients biochemical diagnosis of pheo is not difficult but in a smaller population of hypertension where the biochemical marker are mildly elevated 2000 pg/ml or less the diagnosis become equivocal. Our case was a proven case of pheo and dexmed test basically done to know its response on raised catecholamine levels in a case of pheo.

Our case study concluded that dexmed could effectively suppress catecholamine levels in pheo where as clonidine failed to do so. However the definite inference can be drawn only with larger size study.

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