

Case Report

Blood Pressure Measurement: A Case of “Large” Malpractice

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- Hypertension
- Under cuffing
- Pregnancy
- Hypertensive emergency

Abstract

In this report we describe a pregnant obese patient where an emergency cesarean section was decided following the detection of blood pressure (BP) levels well above the thresholds for a hypertensive urgency/emergency (i.e. 290/160 mmHg), unresponsive to usual iv drugs (namely labetalol, being hydralazine unavailable in our country). After the delivery BP remained severely elevated even under i.v. labetalol (i.e. 230/135). At the first day after the procedure an endocrinological advice was sought for the evaluation of a possible secondary hypertension. At our observation the patient was presented with a monitor for continuous BP recording, where a standard cuff was attached. A severe under cuffing showed to be the cause of a severe overestimation of BP, since the BP measured with the appropriate cuff was lower than 110/60 mmHg. The overestimation of BP due to the too frequent under cuffing is able to induce invasive procedures, when a simple measure of the arm size would be able to prevent such large mistakes and this grade of malpractice.

ABBREVIATIONS

BP: Blood Pressure; ECS: Emergency Cesarean Section

INTRODUCTION

“Hypertension is the most important modifiable cardiovascular risk factor. The blood pressure (BP) measurement is the first step in the diagnosis and evaluation of this clinical setting. Since the end of the 19th Century we are aware of the white coat effect [1] and since the studies of Von Recklinghausen [2] we should be aware that a BP cuff proportional to the arm circumference is mandatory. It has been a century (and more) since then, but the under cuffing seems to be a “classic” in the BP recording mistakes [3].

This common type of malpractice may induce diagnostic and therapeutic decisions both expensive and potentially harmful to the patients' health.

In the following case, a possible overestimation of the BP levels induced a surgical procedure in a pregnant patient.

CASE PRESENTATION

A pregnant (38th week), obese (height 162 cm, weight 139 kg, BMI 53 kg/m², BSA 2.5 m², 39 year old) woman was admitted to the obstetrics division with headache and severe hypertension (BP was as high as 290/160 mmHg in multiple measures). After unsuccessful treatment with repeated pulses of iv labetalol, an emergency cesarean section (ECS) was performed. After the procedure the BP slowly got lower but remained severely elevated, well above the range of a hypertensive urgency/

emergency (i.e. 230/135 mmHg) in spite of a continuous iv labetalol infusion.

In the postpartum serum creatinine was 1.1 mg/dL (nearly doubled from a previous value of 0.6 mg/dL), serum K⁺ 4.0 mEq/L, serum Na⁺ 141 mEq/L, Uric Acid 3.1 mg/dL and only traces of proteinuria (all determinations had been carried out in the Clinical Laboratory of our Hospital by Roche/Hitachi Autoanalyzer cobas c701/702/ISE8000). Both cardiovascular and neurological objectivity were negative.

24 hour after the ECS an endocrinological advice was sought for secondary hypertension.

At our observation the patient was presented with an automated blood pressure device and a “standard” cuff in front of an arm circumference well over the standard limit of 13” i.e. 33 cm (actually it was 18” = 46 cm). BP recordings had ranged apparently from 214/111 to 232/134 during the previous few hours. We repeated the measurement from the same arm (and from the contra lateral) by means of our Omron HEM 907 oscillometric BP monitor (employing an XL cuff for an arm size 17” to 20” i.e. 43 cm to 51 cm).

Mean values ranged from 99/49 to 108/58 mmHg. No EKG changes were seen vs. the previous days, nor acute retinopathy signs were recorded at the direct exam.

Labetalol iv infusion was reduced and then withdrawn. During the following 72 hours the BP was monitored (with an appropriate cuff) and slightly rose up to 125/80 mmHg without drugs while serum creatinine recovered to 0.7 mg/dL.

DISCUSSION

Among many critical points in BP measuring technique, the choice of the cuff represents a slippery slope. The lack of the arm's measurement before BP recording is surprisingly widespread across the Atlantic [3-7], in spite of the great importance attributed by the international Guidelines [8-11]. The possibility of a BP overestimation when employing an inappropriately small cuff is well known from at least a century [2] onwards [12-14]. This topic has been stressed even in obstetric settings [15]. This may well induce inappropriate diagnostic tests or inappropriate overtreatment, with both economic and harmful results.

In the case described above even an emergency surgical procedure was induced by an incorrect BP measurement technique. While actually we do not have any confirmatory evidence about the BP values before the termination of the pregnancy, it may be possible that before the ECS the BP would be elevated, but hardly in the range seen by the inappropriate technique, since in the postpartum setting the overestimation of the BP was as high as 124 mmHg for the systolic levels and 76 mmHg for the diastolic. What seems evident is that in the postpartum the patient was treated by IV drug infusion without the need for it.

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