Is new onset hypertension in obese women more likely to be Gestational Hypertension? - A retrospective study

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ABSTRACT

Introduction: New onset hypertension is more common in antenatal women with increased Body Mass Index (BMI). This may be due to either gestational hypertension (GH) or pre-eclampsia (PE). GH unlike PE is not associated with poor perinatal outcomes and would not require interventions such as increased antenatal visits and induction of labour. Our study assessed the prevalence of GH and PE in women with increased BMI as compared to women with normal BMI. Setting and Design: Historical cohort of a large tertiary centre. Method and Materials: Data from the electronic birth registry of the labour room was used to identify women who had a BMI ≥ 35 kg/m² at delivery. Women with a normal BMI matched for the mode of delivery was taken as control. 148 women with BMI ≥ 35 kg/m² were compared with 140 women of normal BMI. Results: New onset hypertension was seen in 41.2% (61/148) and 8.6% (12/140) in the non-obese group RR 4.81 (2.7-8.54) P(<0.001). GH was seen in 24.3% in obese women and 2.9% in normal controls, RR (9.65 (3.54,26.34)), P(<0.001). PE was seen in 16.9% of obese women and 5.7% of women with normal BMI, RR (3.79 (1.78,8.08)) P(<0.001). Proportion of GH in women with new onset hypertension was seen in 59% of obese women with new onset hypertension and 33% of normal controls. Conclusion: This clinically relevant trend towards an increased proportion of GH highlights the importance of identifying pathophysiologcal mechanism for high BP in obesity when there is new onset hypertension.

Keywords: Gestational hypertension, new onset hypertension, obesity in pregnancy, pre-eclampsia

Introduction

Gestational hypertension (GH) unlike pre-eclampsia (PE) is not associated with poor perinatal outcomes. Differentiating GH from PE is often a challenge. The mechanism by which obesity causes increased BP is not known. The blood pressure can also be high in these obese women because of an incorrect cuff size. High blood pressure may preemt induction of labour, as recommended by the HYPITAT study. However, this recommendation is controversial, as it increases the burden in busy labour rooms. Increased blood pressure in term antenatal women, increases the anxiety for women and their care givers, and therefore is a subject in primary care that needs attention. Our study was aimed to assess if high blood pressure in obese women was GH or PE.

Methods

This study was done in a large tertiary centre that has about 14000 deliveries per year after Institutional Review Board approval (IRB Min No 9254, dated 12.01.2015).

Data from the electronic birth registry of the labour room was used to identify women who had a BMI ≥35 kg/m² at delivery. This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

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between 1 July 2013 and 30 June 2015. There were 1789 women with BMI ≥35 kg/m² at delivery during this period. 1100 of them delivered normally and the rest delivered by lower segment caesarean section (LSCS). From the above we identified about 70 women who delivered by primary LSCS and an equal number that delivered normally and found similar controls with normal BMI (18.5 to 25 kg/m²) for comparison. We decided to include more women with primary LSCS to improve the number of events in the outcomes. Women with twins, with previous LSCS, with incomplete outpatient and inpatient records were excluded. Information was then collected from the outpatient and inpatient records of these women that were chosen randomly from the database. The neonatal details were collected from the in-patient record and discharge summary.

Elevated blood pressure reading of ≥140/90 mmHg at more than 20 weeks of gestation, in the absence of significant proteinuria or any of the features of severe pre-eclampsia, with a normally grown neonate in previously normotensive women was defined as GH. Features of severe pre-eclampsia included systolic blood pressure ≥160 mmHg and diastolic BP ≥110 mmHg, significant proteinuria, abnormal platelets, creatinine or liver enzymes, presences of signs and symptoms of impending eclampsia, abruptio placenta pulmonary edema and the presence of small for gestation neonate. Pre-eclampsia was defined as an elevation of BP ≥140/90 mmHg at gestation >20 weeks with significant proteinuria or any of the above severe features of pre-eclampsia.

A sample size of 108 women in each arm was calculated to show a 17% difference in both arms that was identified by a pilot survey. Two sample t-test and Chi-square test was used to test the mean difference and proportions between groups. All data were analysed using STATA IC/16.0.

### Results

The cohort included 148 women with BMI ≥35 at delivery and 140 non-obese controls with a proportion of women with a similar mode of delivery. The baseline characteristics [Table 1] showed that the women with increased BMI were more likely to have been treated for infertility, had chronic hypertension and pre-gestational diabetes.

### Table 1: Baseline characteristics

| Variables                  | BMI >35 (n=148) | Normal BMI (n=140) | P     |
|----------------------------|-----------------|-------------------|-------|
| Age (SD)                   | 27.5 (4.5)      | 26.3 (4.4)        | 0.018 |
| BMI at delivery kg/m², mean (SD) | 38.5 (3.2) | 24.6 (6.5)        | -     |
| Nullipara n (%)            | 85 (57.4)       | 94 (67.1)         | 0.089 |
| Infertility n (%)          | 24 (16.2)       | 5 (3.6)           | 0.001 |
| Chronic HTN n (%)          | 24 (16.2)       | 6 (4.3)           | <0.001|
| Pre-gestational diabetes n (%) | 8 (5.4)     | 1 (0.7)           | 0.022 |
| Others Medical disorders n (%) | 5 (3.1) | 0 (0.0)           | NA    |

NA – P value calculation is not applicable due to cell counts. *SD – Standard Deviation, **HTN – hypertension

Among the outcomes [Table 2], new onset hypertension was seen in 41.2% (61/148) and 8.6% (12/140) in the non-obese group RR 4.81 (2.7-8.54) <0.001. Both the prevalence of GH and PE were independently more common in the group with increased adiposity. However, among the group of high BMI women, new on onset hypertension was GH in 59% of cases, while this was the case in only 33% of the non-obese controls. This difference was not statistically significant.

Induction of labour was more common in the group with increased adiposity. There was no difference in cases of still births or neonatal complications in the two groups. Commonest neonatal complication was prematurity. The average birth weight was similar in both groups.

### Discussion

This simple small study has called to attention the importance of recognizing that most new onset hypertension in obese women is GH which may have significant implications in clinical practice. Though we saw a clinically relevant increase in the proportion of GH in obese women compared to controls, the difference was not statistically significant probably because of the small sample size of our study.

The main strength of our study was that the retrospective design, though often termed unreliable, actually facilitated answering our research question. As mentioned before, GH is a diagnosis best made retrospectively. Moreover, there was very little scope for bias or significant confounders in this retrospective study. These findings were similar to the large studies done a decade ago,[5,12-15] where a term “Pregnancy Induced Hypertension” for a definition similar to GH was used.

This study was done without any funding and therefore there were several constraints. The limitations of this study were that it was small and included only few variables that we knew were reliably documented. It was for this reason that we selected women with increased BMI at delivery and not at booking. We included more women with primary LSCS to obtain more events.

The high blood pressure in GH which is not associated with vasospasm related end organ involvement, may have another pathophysiological mechanism which is not well established.[16]

The increase in BP associated with adiposity may be related to disturbance in autonomic function and just part of a metabolic syndrome.

In conclusion our study showed a trend towards an increase in GH that was not associated with dreaded complications such as eclampsia, abruptio placenta, intrauterine growth restriction and sudden still birth. This awareness among health providers can prevent unnecessary anxiety while managing obese pregnant women. Currently, this is not well established and therefore not incorporated into undergraduate and postgraduate curriculum. Large studies looking at different variables that establish an
increase in GH in obese antenatal women which is distinct from PE will be the way forward. This can have a substantial impact in primary care as we manage overweight antenatal women that are more prevalent in recent years.

Thus, our small historical cohort has highlighted the need to find the pathophysiological mechanism of hypertension in obesity, to help find markers that can differentiate GH and PE. This would pave the way for translational research, eventually influencing clinical practice.

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Conflicts of interest
There are no conflicts of interest.

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