European Journal of Obstetrics & Gynecology and Reproductive Biology 240 (2019) 322–324

Contents lists available at ScienceDirect

European Journal of Obstetrics & Gynecology and Reproductive Biology

journal homepage: www.elsevier.com/locate/ejogrb

Review article

New blood pressure cut off for preeclampsia definition: 130/80 mmHg

Giovanni Sisti[a,*], Irene Colombi[b]

[a] Department of Obstetrics and Gynecology, Lincoln Medical and Mental Health Center, Bronx, NY, USA
[b] Department of Health Sciences, Obstetrics and Gynecology Branch, University of Florence, Florence, Italy

ARTICLE INFO

Article history:
Received 6 July 2019
Accepted 15 July 2019

Keywords:
Preeclampsia
Cut off
Blood pressure
Definition

ABSTRACT

The classical diagnosis of preeclampsia is usually based on the fulfillment of 3 criteria: pregnancy > 20 weeks of gestation, proteinuria (2+ on dipstick or > 300 mg/24 h) and arterial hypertension ≥ 140/90 mm Hg.

The current blood pressure cut off of 140/90 mm Hg was set by the American College of Obstetrics and Gynecology (ACOG)-issued practice bulletin of 2019, the 2013 Task Force and the guidelines prompted by the International Society for the Study of Hypertension in Pregnancy (ISSHP).

The evidence on which the current cut-off is based is scarce and not updated. We propose the application of the 2017 American College of Cardiology/American Heart Association (ACC/AHA) guidelines on pregnant women and defining preeclampsia with the new 130/80 blood pressure cut-off.

Contents

Introduction

The classical diagnosis of preeclampsia is usually based on the fulfillment of 3 criteria: pregnancy >20 weeks of gestation, proteinuria (2+ on dipstick or > 300 mg/24 h) and arterial hypertension ≥ 140/90 mmHg [1–4].

While on the gestational weeks and the level of proteinuria there has always been general consensus in the academic field, the establishment of a specific blood pressure cut off has been challenging and the current version is the fruit of a quite labored history [5].

The current blood pressure cut off of 140/90 mmHg was set by the American College of Obstetrics and Gynecology (ACOG)-issued practice bulletin of 2019, the 2013 Task Force and the guidelines prompted by the International Society for the Study of Hypertension in Pregnancy (ISSHP) [3,4], (2001 and 2014).

The purpose of this commentary is to review the current guidelines that have proposed the blood pressure cut off of 140/90 in a critical manner and to propose a change in the current blood pressure cut off for the diagnosis of preeclampsia: from 140/90 mmHg to 130/80 mmHg.

Current definition

- ACOG Task Force (2013): in November of 2013, ACOG published an Executive Summary produced by a Task Force of experts for the classification, diagnosis, and management of hypertensive disorders of pregnancy [2]. The updated classification of hypertension in pregnancy included gestational hypertension, preeclampsia with or without severe features, chronic hypertension and superimposed preeclampsia with or without severe features.

In the statement written by the Task Force, the blood pressure cut off of 140/90 mmHg was based on the report of the National

* Corresponding author at: Department of Obstetrics and Gynecology, Lincoln Medical and Mental Health Center, 234 East 149th Street, 10451, Bronx, NY, USA.
E-mail address: gsisti83@gmail.com (G. Sisti).

https://doi.org/10.1016/j.ejogrb.2019.07.019
0301-2115/

High Blood Pressure Education Program Working Group on High Blood Pressure in Pregnancy of 2000 [6].

- **ACOG practice bulletin (2019):** the ACOG practice bulletin number 202 in January 2019 defined preeclampsia as a complication of pregnancy usually occurring after 20 weeks, with a combination of hypertension associated with proteinuria or signs and symptoms of end organ dysfunction such as epigastric pain, headache, elevated transaminase enzymes, low platelets [1].

In this bulletin of 2019, the blood pressure cut off of 140/90 mmHg is based on the same aforementioned National High Blood Pressure Education Program Working Group of 2000 [6].

- **ISSHP (2001 and 2014):** The ISSHP in 2001 [3] (then reconfirmed in 2014 [4] set up the cut off of 140/90 mmHg, based on an article by Davey and MacGillivray dated 1988 [7].

Trail of evidences and critical analysis of the current recommendations

The National High Blood Pressure Education Program Working Group of 2000 [6] based its recommendations on the previous 1990 version of the same [8] document.

The National High Blood Pressure Education Program's article published in November 1990 on the American Journal of Obstetrics and Gynecology is based on a Joint National Committee on Detection, Evaluation and treatment of high blood pressure of 1988 [9].

This statement from 1988 reported mostly about not-pregnant patients, with only a brief comment on pregnant population, about the use of hydralazine, methyldopa or channel blockers in the pregnant population, and does not comment specifically about any blood pressure cut off in pregnant patients [9].

The Joint National Committee on Detection, Evaluation and treatment of high blood pressure of 1988 has been recently outdated by the new 2017 American College of Cardiology/American Heart Association (ACC/AHA) guidelines. The new American guidelines suggest the new cut off of 130/80, instead of 140/90, to start treating high blood pressure with lifestyle changes and medication.

Stage 1 hypertension now is 130/80, while 140/90 becomes Stage 2 under the new guidelines.

The new ACC/AHA guidelines do not give any specific indication for pregnancy.

Indeed, they establish the new cut off to 130/80 for not pregnant women [14], and this new national guideline should be taken into consideration.

The article by Davey and MacGillivray dated 1988 was cited in support of the blood pressure cut off of 140/90 mmHg by the International Society for the Study of Hypertension in Pregnancy [3,4], and many prominent articles of experts [10,11].

Davery and MacGillivray suggest 140/90 because it corresponds to 3 SD above the mean in early and midpregnancy, 2 SD above the mean between 34 and 38 w and 1.5 SD above the mean at term [12] and because, in their opinion, in the perinatal mortality curves made by Friedman in 1976, the diastolic of 90 corresponds to the points of inflection of the curve relating diastolic blood pressure to perinatal mortality [13].

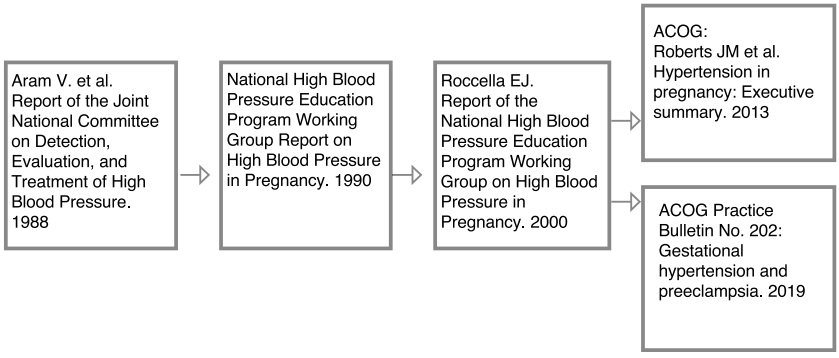

Fig. 1. Trail of articles that led to the cut off of 140/90 mmHg in the ACOG Task Force 2013 and ACOG Bullettin 2019.

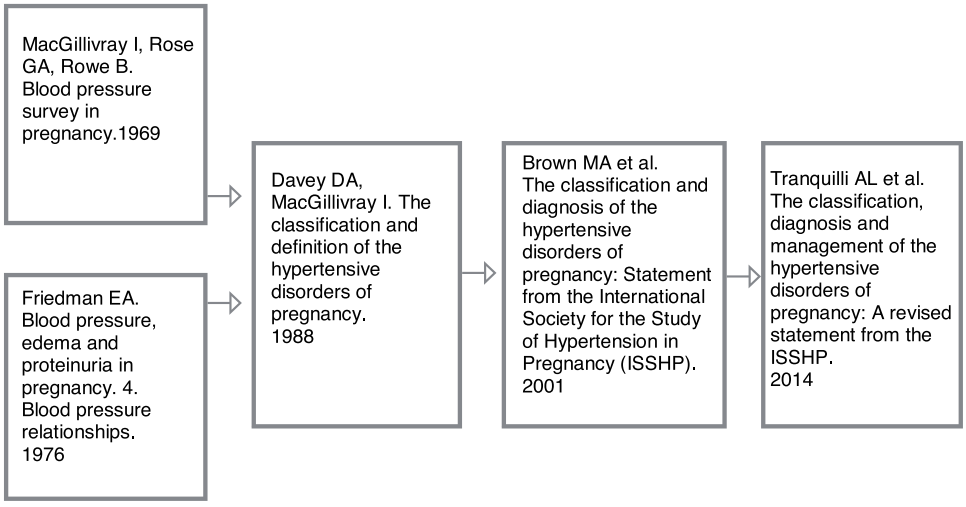

Fig. 2. Trail of articles that led to the cut off of 140/90 mmHg in the ISSHP 2014 guidelines.

The statistical reason for which Davey and MacGillivray used 3 SD for early to midpregnancy, 2 SD between 34 and 38 and then 1.5 SD could be updated with the more modern use of a 2 SD when establishing a cut off in medical statistics [7].

In his article of 1976, Friedman states that superimposing the perinatal mortality curve on the blood pressure distribution curve shows that there is a sharp rise beyond 75 mmHg, and not above 90 mmHg.

Summarizing, the ACOG guidelines are ultimately based on the Joint National Committee on Detection, Evaluation and treatment of high blood pressure dated 1988 [9] (Fig. 1) and the ISSHP guidelines are based on an article by Davey and MacGillivray dated 1988 [7] (Fig. 2).

Unfortunately, both of these articles present few aforementioned methodological weaknesses and are not updated to the current clinical scenario.

In addition, the blood pressure measurement methodology and instruments have changed so much in the last 40 yeras: we are now far from the old Riva-Rocci/Korotkoff old sphygmomanometer that was used for the cited seminal experiments [13] and was subject to many type of errors [15]. The Korotkoff method is indeed dependent on the accurate transmission and interpretation of a signal from a subject via a device to an observer.

Proposal for modifications

We think that the foundation for the choice of the current cut off of 140/90 is not updated and it is time to incorporate the new AHA guidelines cut off into the evaluation of pregnant patients with preeclampsia [14]. Adopting the new cut off of 130/80 seems reasonable. Some have advocated the support of new trials in order to change the cut off [16].

We showed that the current cut off of 140/90 is not based on any clinical trial specifically designed for pregnant patients. Starting new clinical trials would be ethically difficult and would delay the application of a new blood pressure cut off into the daily clinical practice.

References

[1] ACOG Practice Bulletin No. 202: Gestational hypertension and preeclampsia. American College of Obstetricians and Gynecologists. Obstet Gynecol 2019;133:e1–e25.
[2] Roberts JM, August PA, Bakris G, Barton JR, Bernstein IM, Druzin M, et al. Hypertension in pregnancy: executive summary. Obstet Gynecol 2013.
[3] Brown MA, Lindheimer MD, De Swiet M, Van Assche A, Moutquin JM. The classification and diagnosis of the hypertensive disorders of pregnancy: statement from the International Society for the Study of Hypertension in Pregnancy (ISSHP). Hypertens Pregnancy 2001.
[4] Tranquilli AL, Dekker G, Magee L, Roberts J, Sibai BM, Steyn W, et al. The classification, diagnosis and management of the hypertensive disorders of pregnancy: a revised statement from the ISSHP. Pregnancy Hypertens 2014.
[5] Bell MJ. A historical overview of preeclampsia-eclampsia. JOGNN - J Obstet Gynecol Neonatal Nurs 2010.
[6] Roccella EJ. Report of the national high blood pressure education program working group on high blood pressure in pregnancy. Am J Obstet Gynecol 2000.
[7] Davey DA, MacGillivray I. The classification and definition of the hypertensive disorders of pregnancy. Am J Obstet Gynecol 1988.
[8] National high blood pressure education program working group report on high blood pressure in pregnancy. Am J Obstet Gynecol 1990;163:1689–712.
[9] Chobanian Aram V, Alderman Michael H, DeQuattro Vincent, et al. The 1988 report of the joint national committee on detection, evaluation, and treatment of high blood pressure. Arch Intern Med 1988;148(5):1023–38.
[10] North RA, Taylor RS, Schellenberg JC. Evaluation of a definition of pre-eclampsia. BJOG An Int J Obstet Gynaecol 1999.
[11] English FA, Kenny LC, McCarthy FP. Risk factors and effective management of preeclampsia. Integr Blood Pressure Control 2015.
[12] MacGillivray I, Rose GA, Rowe B. Blood pressure survey in pregnancy. Clin Sci 1969;37(October (2)):395–407.
[13] Friedman EA. Blood pressure, edema and proteinuria in pregnancy. 4. Blood pressure relationships. Prog Clin Biol Res 1976.
[14] Whelton PK, Carey RM, Aronow WS, Ovbiagele B, Casey DE, et al. Guideline for the Prevention, Detection, Evaluation, and Management of High Blood Pressure in Adults A Report of the American College of Cardiology / American Heart Association T. J Am Coll Cardiol 2017;2017:.
[15] Beevers G, Lip GYH, O'brien E. Blood pressure measurement: part ii—conventional sphygmomanometry: technique of auscultatory blood pressure measurement. BMJ 2001.
[16] Sisti G. Maternal outcomes associated with lower range stage 1 hypertension. Obstet Gynecol 2019;133(January (1)):190.