

The new algorithm of clinical management for severe pre-eclampsia

Prof. Dmytro G Konkov National Pirogov Memorial Medical University, Vinnytsya, Ukraine

Prof. Vladimir I Medved SI «Institute of Pediatrics, Obstetrics and Gynecology, NAMS of Ukraine», Kyiv

Prof. Ruslan O Tkachenko National Medical Academy of Postgraduate Education PL Shupika, Kyiv

Prof. Olha V Bulavenko National Pirogov Memorial Medical University, Vinnytsya, Ukraine



Conflict of interest: None declared

Introduction

Preeclampsia (PE) is a potentially dangerous pregnancy complication with increasing significance worldwide. The incidences of PE are 5 to 14% of all pregnancies in the world, contributes to 18% of preterm birth, and 10%-27% of global maternal deaths worldwide, while severe PE can develop to about 25 % of all cases of preeclampsia. Severe preeclampsia may lead to liver and renal failure, disseminated intravascular coagulopathy (DIC), and disorders of the central nervous system (CNS). Preeclampsia is the permanent cause of neonatal mortality and morbidity. Early optimal clinical management for severe PE at all levels of hospital care is required for better maternal as well as perinatal outcomes. Recent developments in the understanding of the pathophysiology of preeclampsia have opened new avenues for prevention, screening, and management of this condition. In addition it is known that pre-eclampsia is a risk factor for cardiovascular disease in both the mother and the child and presents an opportunity for early preventative measures. New tools for early detection, prevention, and management of preeclampsia have the potential to revolutionize practice in the coming years

Aim

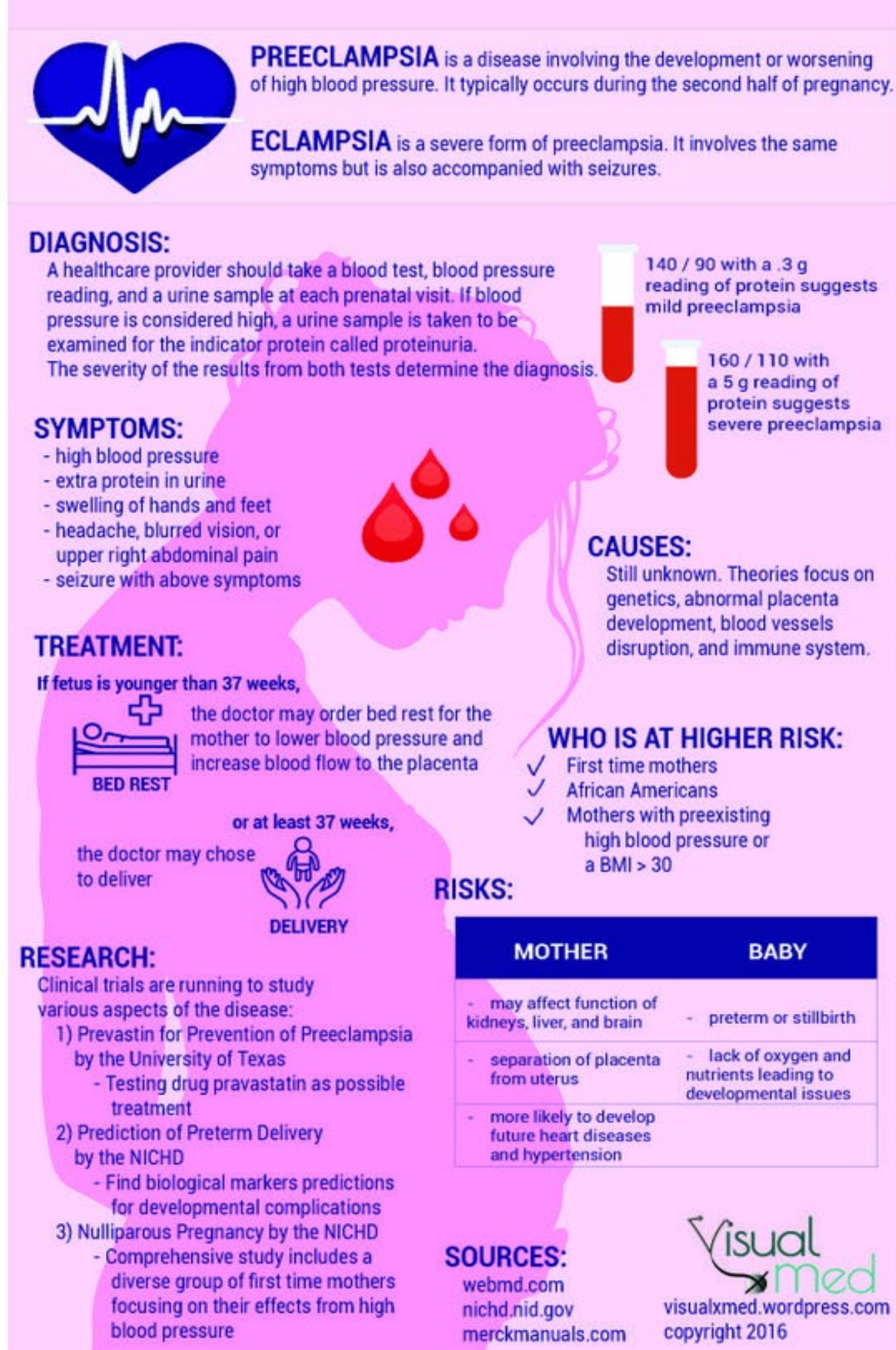
We presented the new algorithm of clinical management for severe pre-eclampsia "CALM DOWN"/ The purpose of clinical implementation of the CALM DOWN action algorithm for medical personnel with severe preeclampsia will to reduce maternal and perinatal mortality as a result of complex teamwork.



References:

Medved V.I., Zhuk S.I., Konkov D.G. [et al.] Severe pre-eclampsia. CALM DOWN - algorithm of actions of medical personnel. Health of woman. 2017; 10(126):28–33.
Konkov D.G., Taran O.A., Lobastova T.V. The implementation of new algorithm of the management of severe pre-eclampsia (Clinical case report). Clinical Anesthesiology and Intensive Care. 2018; 2(12):74-87.

PREECLAMPSIA AND ECLAMPSIA



<https://www.pinterest.com/pin/753438212636946011>

Results

CALM DOWN is the special mnemonic that means "step by step strategy" for the medical teamwork. We have proposed the new algorithm for medical teamwork "CALM DOWN" in the cases of severe preeclampsia that will allow systematizing and optimizing the participation of each member of the team in the provision of emergency care and improving effectiveness clinical management (Table 1).

"C" is Calling for help (duty doctors and anesthesiologist with fixation of actual time). "A" is Assessment (assess the airway, auscultation, re-measure blood pressure, pulse rate, oxygen saturation, fetal heartbeats, assess the patient consciousness).

"L" is Low blood pressure (antihypertensive therapy) according to Table 2.

"M" is Magnesium (intravenous therapy is with a bolus dose of diluted magnesium sulfate).

Interval is evaluated on the effectiveness of prescribed medications (goal of BP < 150-160/90-100 mm Hg is recommended).

"D" is Decision (decide about further management. Transfer to the intensive care unit or operating theatre or delivery room, depending on gestational age and patient's condition).

"O" is Oliguria (fluid restriction in preeclampsia is recommend no more than 60-80 mL/h of IV fluids).

"W" is fetal Wellbeing (monitor fetal well-being with Doppler assessment).

"N" is parturition (delivery is the best treatment for all women with severe preeclampsia regardless of gestational age).

Early detection, and optimal algorithm of medical personnel management of severe PE at all levels of health care are required for better maternal as well as perinatal outcome.

Mnemonic	Definition	Action of personnel	Time
C	Calling for help	Calling on duty doctors, an anesthesiologist at the onset of symptoms of severe preeclampsia, with fixation of actual time.	1-3 min
A	Assessment	Check the airway, auscultation of the lungs, re-measure blood pressure, heart rate, assess the oxygen saturation, fetal heart beats, assess the patient's consciousness.	3-5 min
L	Low blood pressure	Antihypertensive therapy: nifedipine 10 mg p.o., urapidil 10 mg IV or labetalol 20 mg IV or hydralazine 5 mg IV.	5-10 min
M	Magnesium sulfate	Intravenous therapy is with a loading dose of 4 g of diluted magnesium sulphate (in 50 ml).	10-15 min
	Pause	Evaluate the effectiveness of prescribed medications. A goal of <150-160/90-100 mmHg is recommended.	5-10 min
D	Decision	Decide about further management. Transfer to the intensive care unit or operating theatre or delivery room, depending on gestational age and patient' condition.	5-10 min
O	Oliguria	Women with severe preeclampsia immediately prior to regional anaesthesia or immediate delivery: 250 mL bolus. Fluid restriction in pre-eclampsia is recommended no more than 60-80 mL/h of IV fluids.	5-10 min
W	Fetal Well being	Monitor fetal well-being with NST and ultrasonographic assessment.	10-30 min
N	Parturition	All women with severe pre-eclampsia or eclampsia should be delivered within 24 hours, regardless of gestational age.	

Table 1. The algorithm of medical personnel actions in the cases of severe preeclampsia «CALM DOWN»

Conclusion

Our algorithm for the actions of medical personnel CALM DOWN in the cases of severe preeclampsia, offers to systematize and optimize the participation of each member of the team in the provision of emergency care. The sequence of actions also depends on the number of medical staff in various health care facilities. That is why the indicated CALM DOWN algorithm should be implemented in clinical practice based on the peculiarities of the specifics of work, resources, functioning and localization of the maternity facilities when forming the route of the patient.

Table 2. Medications used most commonly for treatment of a blood pressure $\geq 160/110$ mmHg

Medication	Mechanism of action	Dosage	Onset	Peak	Duration
Nifedipine	Calcium channel blocker (vasodilator)	5–10 mg to swallow without biting Repeat after 30 min.	5-10 min	30-45 min	6 h
Labetalol	Peripheral alpha-1 and (non-selective) beta-1 and 2 receptor antagonist	Start with 20 mg IV over 2 min Repeat with 40 mg then 80 mg IV (each over 2 min) q 30 min Continuous infusion 1–2 mg/min (max dosage 300 mg).	5 min	30 min	4 h
Hydralazine	Direct-acting vasodilator	Intermittent dosing 5 mg IV Repeat 5–10 mg IV every 30 min Continuous infusion 0.5–10 mg/h IV (max dosage 45 mg).	5 min	20-30 min	3-8 h
Urapidil	α_1 -adrenoceptor antagonist and 5-HT _{1A} receptor agonist	Initially 5-10 mg slow IV (over 2 min) followed by 3–24 mg/h (via syringe driver) Continue with a maintenance infusion of 6-9 mg/hr once BP is reduced sufficiently.	2-3 min	5-15 min	3 h
Clonidine	Centrally acting alpha-2 receptor agonist	0,1–0,2 mg orally (max dosage 0.8 mg).	10-30 min	2-4 h	6-10 h
Nitroglycerin infusion	Direct vasodilators that has its affects veins more than arterioles	5 μ g/min, increased every 5 min (max rate 100 μ g/min).	2-5 min	5 min	5-10 min
Captopril only postpartum	Angiotensin-converting enzyme inhibitor	6,25–12,5 mg orally Repeat in 1 h (max dosage 75 mg).	30 min	60-90 min	≥ 8 h