

# MANAGEMENT DELL'IPERTENSIONE IN GRAVIDANZA E MODALITA' DI PARTO

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*in collaborazione con*

Emilia Romagna e le altre Regioni della Macro Area NORD  
della

**FEDERAZIONE ITALIANA di OSTETRICA e GINECOLOGIA**



RACCOMANDAZIONI DI ASSISTENZA  
IPERTENSIONE IN GRAVIDANZA  
2003

A cura del Gruppo di Studio SLOG:  
M.Lovotti (coordinatore), S.Bottino, T.Frusca, A.Lojacono

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# PREMESSE

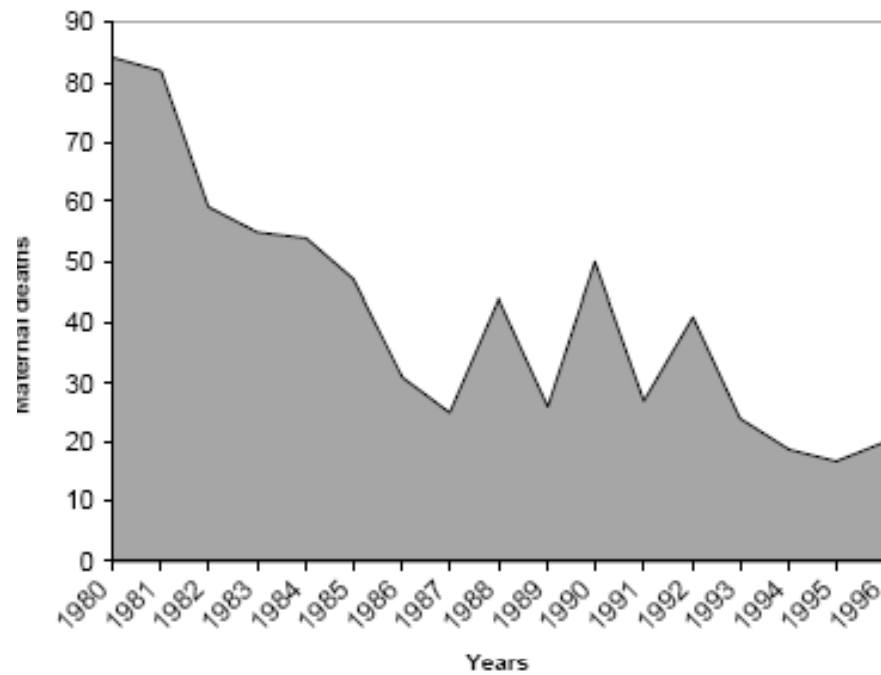


Fig. 1. Maternal deaths in Italy (1980-1996).

## Maternal mortality in Italy, 1980-1996

Arabella Biaggi, Giancarlo Paradisi, Sergio Ferrazzani, Sara De Carolis, Angela Lucchese, Alessandro Caruso\*

European Journal of Obstetrics & Gynecology and Reproductive Biology 114 (2004) 144-149

**Table 2**  
Causes of maternal death in Italy, from 1980-1996 (ISTAT)

	<i>n</i>	Percentage	Mean	S.D.
<b>Causes of death</b>				
Haemorrhage	164	23.2	9.7	23.2
Hypertension	145	20	8.5	20
Others labour and delivery complications	100	14.1	5.8	2.7
Abortion	87	12.3	5.1	3.3
Obstetric lesions	30	4.2	1.7	1.9
Pulmonary embolism	28	3.9	1.6	1.3
Puerperal infection	9	1.2	0.5	1.0
Others	142	21.1	-	-
<b>Total</b>	<b>705</b>	<b>100</b>	-	-

# PREMESSE

**Table 1**  
Obstetric admissions to the intensive care unit and their causes between 1998 and 2008

Causes	No. of cases (n=95)	Percentage of ICU transfers
Pre-eclampsia	27	28.4
HELLP	17	17.9
DIC	6	6.3
Eclampsia	6	6.3
Hemorrhage	5	5.2
Monitoring post cesarean	5	5.2
Maternal cardiopathy	5	5.2
Respiratory failure	4	4.2
Others <sup>a</sup>	20	21

~60%

Abbreviations: DIC, disseminated intravasclature coagulation; ICU, intensive care unit.

<sup>a</sup> Including convulsions, pulmonary edema, fever post cesarean delivery, chest pain.

Near-miss and maternal mortality in a tertiary care facility in Italy

Lorenza Driul, Giorgio Fachechi \*, Leonardo Forzano, Diego Marchesoni

Department of Obstetrics and Gynecology, University of Udine, Udine, Italy

# PREMESSE

## Substandard care in maternal mortality due to hypertensive disease in pregnancy in the Netherlands

JM Schutte,<sup>a</sup> NWE Schuitemaker,<sup>b</sup> J van Roosmalen,<sup>c</sup> EAP Steegers<sup>d</sup> on behalf of the Dutch Maternal Mortality Committee

**Table 4.** Summary of substandard care identified

<b>Substandard care overall</b>	26/27 (96%)
<b>On more than five different items</b>	17/27 (63%)
<b>Woman refusing medical care</b>	2/27 (7%)
<b>No instructions regarding danger signs to woman documented</b>	22/27 (81%)
<b>Community midwifery care</b>	
No testing of proteinuria while indicated	11/27 (41%)
No measurement of BP when indicated	3/27 (11%)
No measurement of BP in first trimester	2/27 (7%)
Too long interval between antenatal visits	5/27 (19%)
Delay of referral after diagnosis	4/27 (15%)

<b>Hospital</b>	
No sufficient diagnostic testing when presenting with symptoms	11/27 (41%)
<b>Inadequate treatment of severe hypertension</b>	<b>23/27 (85%)</b>
No antihypertensive treatment while BP above 170/110 mmHg	10/27 (37%)
Delay treatment of hypertension	8/27 (30%)
Oral hypertensive treatment only (methyldopa) in case of severe hypertension	6/27 (22%)
Too low dosages hypertensive treatment	5/27 (19%)
No MgSO <sub>4</sub> when indicated	15/27 (56%)
Delay MgSO <sub>4</sub> administration	3/27 (11%)
No transferral to ICU when indicated	6/27 (22%)
No referral to a tertiary centre, with a gestational age below 32 weeks	2/27 (7%)
Inadequate stabilisation before transport to tertiary care centres or before delivery	14/27 (52%)
Ergometrine postpartum	1/27 (4%)

## Maternal death in the 21st century: causes, prevention, and relationship to cesarean delivery

Steven L. Clark, MD; Michael A. Belfort, MD; Gary A. Dildy, MD;  
Melissa A. Herbst, MD; Janet A. Meyers, RN; Gary D. Hankins, MD


TABLE 1  
Causes of maternal death

Cause of death	Number	%
Complications of preeclampsia	15	16
Amniotic fluid embolism	13	14
Obstetric hemorrhage	11	12
Cardiac disease	10	11
Pulmonary thromboembolism	9	9
Nonobstetric infection	7	7
Obstetric infection	7	7
Accident/suicide	6	6
Medication error or reaction	5	5
Ectopic pregnancy	1	1
Other	11	12
Total	95	100

5/15  
PREVENIBILI

Clark. Maternal death in the 21st century. *Am J Obstet Gynecol* 2008.

## CAUSE DI MORTALITA' MATERNA (U.K. 1982-90)



□ emorragia cerebrale	36	
□ edema cerebrale	5	46
□ infarto cerebrale	3	
□ necrosi corticale	1	
□ encefalomalacia	1	
<hr/>		
□ complicazioni polmonari	24	
□ necrosi epatica	3	32
□ altri	5	

## MORTALITA' MATERNA: OSSERVAZIONI



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- quasi sempre post-partum
- rischi legati alla intubazione
- più frequenti gli accidenti cerebro-vascolari
- edema polmonare: fluid overload
- danno epatico: raro
- danno renale: raro

## RISCHIO DI CVA



- PAD  $\geq$  110 mmHg
- eclampsia: 30% PAD  $<$  90 mmHg
- rischio materno associato al danno vascolare, non alle convulsioni
- rischio materno associato all'ipertensione

# MANAGEMENT DELL'IPERTENSIONE IN GRAVIDANZA



- **Trattamento dell'ipertensione**
- **Rischio materno**
- **Rischio fetale**
- **Modalità di parto**

# TRATTAMENTO DELL'IPERTENSIONE

**Table 1. BP Classification: JNC-7 vs NHBPEP**

JNC-7 BP Classification (2003) (Nonpregnant), mm Hg	NHBPEP BP Classification (2000) (Pregnant), mm Hg
Normal SBP $\leq$ 120 and DBP $<$ 80	Normal/acceptable in pregnancy SBP $\leq$ 140 and DBP $<$ 90
Prehypertension SBP 120 to 139 or DBP 80 to 89	
Stage 1 hypertension SBP 140 to 159 or DBP 90 to 99	minor hypertension SBP 140 to 150 or DBP 90 to 100
Stage 2 hypertension SBP 160 to 179 or DBP 100 to 110	severe hypertension $\geq$ 160 systolic or $\geq$ 110 diastolic
Stage 3 hypertension SBP 180 to 209 or DBP 110 to 119	

U.S.:  $\geq$  160/105 mmHg no target

Canada:  $\geq$  140/90 mmHg target: PAD 80-90 mmHg

Australia:  $\geq$  160/90 mmHg target: PAS  $\geq$  110 mmHg

JNC-7 indicates the Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure<sup>4</sup>; NHBPEP, National High Blood Pressure Education Program Working Group Report on High Blood Pressure in Pregnancy.<sup>1</sup>

## Antihypertensive drug therapy for mild to moderate hypertension during pregnancy (Review)

Abalos E, Duley L, Steyn DW, Henderson-Smart DJ

### AUTHORS' CONCLUSIONS

#### Implications for practice

It remains unclear whether antihypertensive drug therapy for mild to moderate hypertension during pregnancy is worthwhile. **HYPERTENSION GRAVE: R.R 0.50**

Whether the reduction in the risk of severe hypertension is considered sufficient to warrant treatment is a decision that should be made by women in consultation with their obstetrician. If an antihypertensive is used, there is insufficient evidence to conclude that one antihypertensive is better than another. The choice should therefore depend on the previous experience of the clinician and the woman's preference.



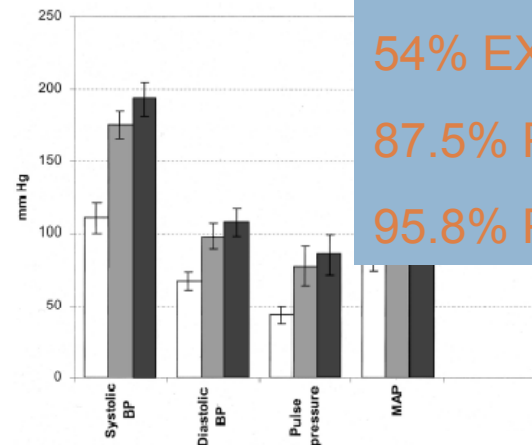
#### Authors' conclusions

It remains unclear whether antihypertensive drug therapy for mild to moderate hypertension during pregnancy is worthwhile.

# Stroke and Severe Preeclampsia and Eclampsia: A Paradigm Shift Focusing on Systolic Blood Pressure

James N. Martin Jr, MD, Brad D. Thigpen, DO, Robert C. Moore, MD, Carl H. Rose, MD,  
Julie Cushman, RN, and Warren May, PhD

(Obstet Gynecol 2005;105:



28 PAZIENTI CON STROKE

54% EXITUS

87.5% PAD  $\leq$  110 mmHg

95.8% PAS  $\geq$  160 mmHg

Martin. Stroke and Severe Preeclampsia/Eclampsia. Obstet Gynecol 2005.

**Table 2.** Baseline and Prestroke Blood Pressure Comparisons

Measure	Pregnancy Baseline	Prestroke	Change
Mean systolic BP	110.9 $\pm$ 10.7 (n = 25)	175.4 $\pm$ 9.7 (n = 24)	64.4 $\pm$ 11.6 (n = 22)
Systolic BP range	90–136	159–198	39–85
Systolic BP % $\geq$ 160	0	95.8	
Mean diastolic BP	67.4 $\pm$ 6.5 (n = 25)	98.0 $\pm$ 9.0 (n = 24)	30.6 $\pm$ 9.6 (n = 22)
Diastolic BP range	58–80	81–113	8–53
Diastolic BP % $\geq$ 110	0	12.5 (n = 3)	
Diastolic BP % $\geq$ 105	0	20.8 (n = 5)	
Mean pulse pressure	43.6 $\pm$ 6.7 (n = 25)	77.4 $\pm$ 13.8 (n = 24)	33.8 $\pm$ 14.1 (n = 22)
Pulse pressure range	30–57	57–102	13–59
Mean MAP	81.7 $\pm$ 7.7 (n = 25)	123.9 $\pm$ 6.6 (n = 24)	42.1 $\pm$ 8.2 (n = 21)
MAP range	69–98	114–138	25–57
MAP % $\geq$ 125	0	45.8	
MAP % $\geq$ 130	0	20.8	

BP, blood pressure in millimeters of mercury; MAP, mean arterial pressure in millimeters of mercury.

# Fall in mean arterial pressure and fetal growth restriction in pregnancy hypertension: a meta-analysis

P von Dadelszen, M P Ornstein, S B Bull, A G Logan, G Koren, L A Magee

Lancet 2000; 355: 87-92

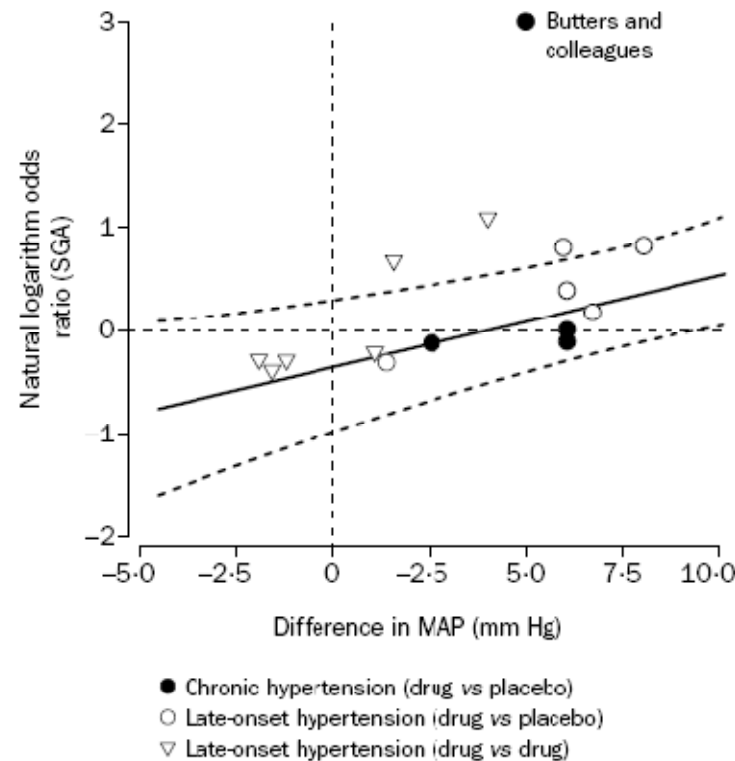


Figure 1: **Relation between fall in MAP and proportion of SGA infants**

Spearman's  $\rho=0.69$  ( $p=0.007$ ) without Butters and colleagues' trial,<sup>6</sup>  
 $\rho=0.64$  ( $p=0.01$ ) with that trial.

# IPERTENSIONE LIEVE: TRATTAMENTO

**Table 2. Drugs for Gestational or Chronic Hypertension in Pregnancy**

Drug (FDA Risk)*	Dose	Concerns or Comments
<b>Preferred agent</b>		
Methyldopa (B)	0.5 to 3.0 g/d in 2 divided doses	Drug of choice according to NHBEP; safety after first trimester well documented, including 7 years follow-up of offspring
<b>Second-line agents†</b>		
Labetalol (C)	200 to 1200 mg/d in 2 to 3 divided doses	May be associated with fetal growth restriction
Nifedipine (C)	30 to 120 mg/d of a slow-release preparation	May inhibit labor and have synergistic action with magnesium sulfate in BP lowering; little experience with other calcium entry blockers
Hydralazine (C)	50 to 300 mg/d in 2 to 4 divided doses	Few controlled trials, long experience with few adverse events documented; useful in combination with sympatholytic agent; may cause neonatal thrombocytopenia
β-Receptor blockers (C)	Depends on specific agent	May decrease uteroplacental blood flow; may impair fetal response to hypoxic stress; risk of growth restriction when started in first or second trimester (atenolol); may be associated with neonatal hypoglycemia at higher doses
Hydrochlorothiazide (C)‡	12.5 to 25.0 mg/d	Majority of controlled studies in normotensive pregnant women rather than hypertensive patients; can cause volume contraction and electrolyte disorders; may be useful in combination with methyldopa and vasodilator to mitigate compensatory fluid retention
Contraindicated ACE-Is and angiotensin type 1 receptor antagonists (D)‡		Leads to fetal loss in animals; human use associated with cardiac defects, fetopathy, oligohydramnios, growth restriction, renal agenesis and neonatal anuric renal failure, which may be fatal

Update on the Use of Antihypertensive Drugs in Pregnancy  
Tiina Podymow and Phyllis August  
*Hypertension* 2008;51:960-969; originally published online Feb 7, 2008;

# IPERTENSIONE GRAVE: TRATTAMENTO

**Table 3. Drugs for Urgent Control of Severe Hypertension in Pregnancy**

Drug (FDA Risk*)	Dose and Route	Concerns or Comments†
Labetalol (C)	10 to 20 mg IV, then 20 to 80 mg every 20 to 30 minutes, maximum of 300 mg; for infusion: 1 to 2 mg/min	Because of a lower incidence of maternal hypotension and other adverse effects, its use now supplants that of hydralazine; avoid in women with asthma or congestive heart failure
Hydralazine (C)	5 mg, IV or IM, then 5 to 10 mg every 20 to 40 minutes; once BP controlled repeat every 3 hours; for infusion: 0.5 to 10.0 mg/h; if no success with 20 mg IV or 30 mg IM, consider another drug	A drug of choice according to NHBEP; long experience of safety and efficacy
Nifedipine (C)	Tablets recommended only: 10 to 30 mg PO, repeat in 45 minutes if needed	We prefer long-acting preparations; although obstetric experience with short acting has been favorable, it is not approved by the FDA for management of hypertension
Diazoxide (C)	30 to 50 mg IV every 5 to 15 minutes	Use is waning; may arrest labor; causes hyperglycemia
Relatively contraindicated nitroprusside (C)‡	Constant infusion of 0.25 to 5.00 µg/kg per minute	Possible cyanide toxicity if used for >4 hours; agent of last resort

Update on the Use of Antihypertensive Drugs in Pregnancy  
 Tiina Podymow and Phyllis August  
*Hypertension* 2008;51:960-969; originally published online Feb 7, 2008;

**Evaluation of a strict protocol approach in managing women with severe disease due to hypertension in pregnancy: A before and after study**

Hennie Lombaard\*<sup>1</sup>, Robert C Pattinson<sup>1</sup>, Fèbè Backer<sup>1</sup> and Peter Macdonald<sup>2</sup>

**BEFORE STUDY... (1997-98)**

**Idralazina 1,25 mg e.v. ogni 15 minuti per PAD  $\geq$  110 mmHg**

**MgSO<sup>4</sup> in presenza di eclampsia**

**Idratazione non routinaria**

**Management basato su esperienza dell'operatore**

**Repr Health, 2005**

## ...AFTER STUDY: STABILIZZAZIONE...

Organ system	Acute management	Maintenance	Management of complications
Fluid management	Start IV line give 300 ml fluid bolus: 100 ml Ringers lactate 200 ml normal saline with loading dose of magnesium sulphate Urinary Catheter	Give Ringers lactate 125 ml/hr iv. Start a fluid balance chart	If poor output repeat fluid bolus. If still poor output and positive fluid balance start low-dose dopamine infusion
Magnesium Sulphate	4 g magnesium sulphate in 200 ml saline over 20 min iv 5 g magnesium sulphate with 1 ml lignocaine im in each buttock	Maintenance: 5 g four hourly iv Check before next dosage: Urine output > 30 ml/hr Tendon reflexes present Respiratory rate more than 16/min Use either nifedipine or labetalol	In case of magnesium sulphate overdose give calcium gluconate
Blood pressure control	Repeat blood pressure after 20 min and if diastolic $\geq 110$ or systolic $\geq 160$ treat according to the antihypertensive drug protocol		
Neurological status	If still confused check saturation and blood pressure	Abnormal saturation: Give oxygen via mask Abnormal blood pressure: treat with appropriate drugs	If both are normal: give haloperidol

## ...AFTER STUDY (2002-2003) ...

Table 3: Summary of the systemic evaluation and special investigations of critical ill women with complications of hypertension

Organ system evaluated	Clinical examination	Special investigations
Central nervous system	Glasgow coma scale Lateralising signs Reflexes Pupil reflexes	If any abnormalities consider CT Scan
Respiratory system	Respiratory rate Blood gas Check for dullness on percussion, crepitations or wheezes	If any abnormalities do blood gas and Chest X-ray
Cardiovascular system:	Pulse, Blood pressure Heart sounds Heart size Radio-femoral delay	
Gastro intestinal system:	Check for epigastric tenderness, hepatomegaly	Check AST and for jaundice. 4 hourly blood glucose test if raised AST
Renal system:	Check for renal angle tenderness, macroscopic hematuria Listen for murmurs over the renal artery	Check creatinine and fluid balance. If signs of kidney dysfunction do full kidney function tests
Haematological system:	Check for anaemia, purpura, bleeding tendency	Check hematocrit and platelets
Immune system:	Body temperature Check for generalized lymphadenopathy, splenomegaly, signs of immune system failure	Voluntary counselling and HIV testing if CD4 and ESR above 100
Musculoskeletal System	Check for signs of DVT Check for spinal problems that might influence the type of anaesthesia	
Gynaecological system:	Abdominally: measure symphysis-fundus height, lie & position of the foetus, check for uterine tenderness or contractions, estimate foetal weight, measure amniotic fluid, check for foetal heart rate Vaginal exam: assess the Bishop score	
Fundoscopy:	Check for silver wiring, papillar oedema and signs of bleeding	

**Table 4: Comparison between the sub-categories of complications of hypertension in pregnancy and their Mortality Indices.**

	1997–1998					2002–2003					p MI
	MD	SAMM	Total	%	MI	MD	SAMM	Total	%	MI	
Chronic Hypertension	1	2	3	3.1	33.3	1	4	5	4.8	20.0	
Proteinuric Hypertension	6	22	28	28.9	21.4	4	30	34	32.7	11.8	0.49
Eclampsia*	9	38	47	48.5	19.1	6	22	28	26.9	21.4	0.52
HELLP**	2	17	19	19.6	10.5	1	35	36	34.6	2.8	0.27
Liver rupture	0	0	0	0.0	0.0	1	0	1	1.0	100.0	
<b>All Hypertension</b>	<b>18</b>	<b>79</b>	<b>97</b>	<b>100</b>							

**Mortality index dal 18.5% al 12.5%**

MD – Maternal Death; SAMM – Severe acute maternal morbidity; MI – Mortality Index

\* – Significant decline in proportion of eclampsia from 1997/8 to 2002/3,  $p = 0.0026$

\*\* – Significant increase in proportion of women with HELLP syndrome 1997/8 to 2002/3,  $p = 0.026$

**Table 5: Comparison of the prevalence of organ system dysfunction/failure per severely ill pregnant women with complications due to hypertension.**

Organ system	1997–1998				2002–2003				RR (95% CI)
	SAMM n = 79	MD n = 18	SAMM+M D N = 97	% OSD	SAMM N = 91	MD N = 13	SAMM+M D N = 104	% OSD	
Hypovolaemic shock	7	1	8	8.2	5	1	6	5.8	0.7 (0.25 – 1.94)
Respiratory failure	17	4	21	21.6	29	3	32	30.8	1.42 (0.88 – 2.29)
Cardiac failure	25	5	30	30.9	23	4	27	26.0	0.84 (0.54 – 1.30)
Renal failure	29	4	33	34.2	11	2	13	12.5	0.37 (0.21 – 0.66)
Liver failure	5	2	7	7.2	1	1	2	1.9	0.27 (0.06 – 1.25)
Cerebral complications	24	10	34	35.1	9	6	15	14.4	0.52 (0.34 – 0.81)
Haematological dysfunction	25	4	29	29.9	26	1	27	26.0	0.87 (0.56 – 1.36)
Immune system failure*	1	1	2	2.1	6	3	9	8.7	4.2 (0.93 – 18.94)

% OSD – Percentage of severely ill women who developed that organ system dysfunction/failure

Note: A patient can have more than one organ system dysfunction/failure

\* Fisher exact: 2 sided 0.060

: 1 sided 0.038

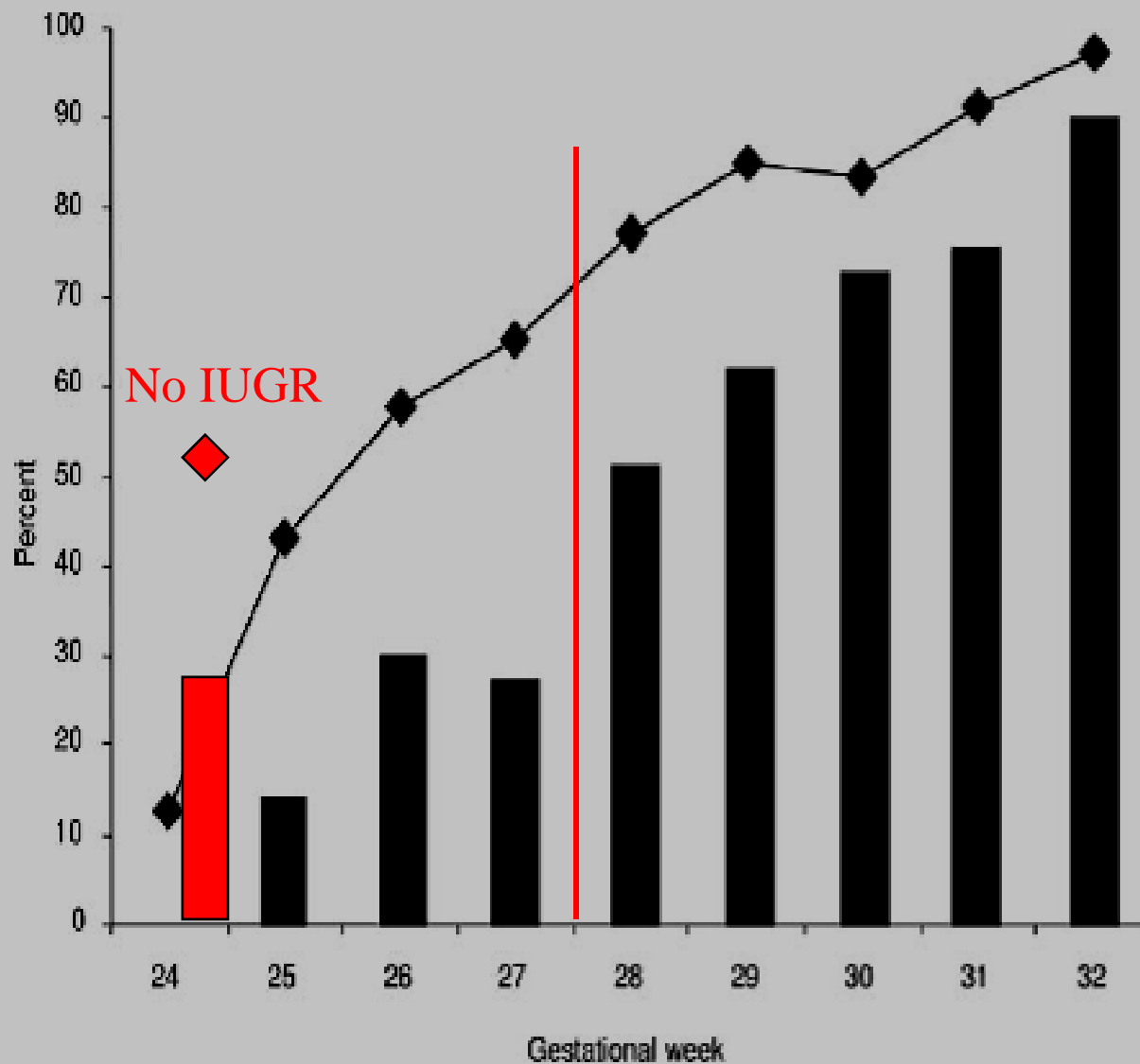
## “STANDARD CARE”

- Training dello staff medico-infermieristico: tests diagnostici, terapia antiipertensiva ed anticonvulsivante
- Preparazione ed aggiornamento continuo di un protocollo clinico comune e condiviso
- Coinvolgimento di altre figure professionali (anestesista, nefrologo, cardiologo, endocrinologo)
- Attento bilancio dei rischi nel trattamento conservativo: mai > 34 settimane
- Istruzione sui sintomi (es: dolore epigastrico) delle pazienti a rischio

# MANAGEMENT DELL'IPERTENSIONE IN GRAVIDANZA



- Trattamento dell'ipertensione
- Rischio materno
- **Rischio fetale**
- Modalità di parto



2% sopravvivenza/  
giorno di attesa

**Fig. 1.** Neonatal survival and intact survival rates per gestational week. This figure shows the increase in survival (*black diamonds*) and intact survival rates until discharge (*black bars*) in growth-restricted neonates with advancing gestational week.

*Baschat. Neonatal Outcome in Fetal Growth Restriction. Obstet Gynecol 2007.*

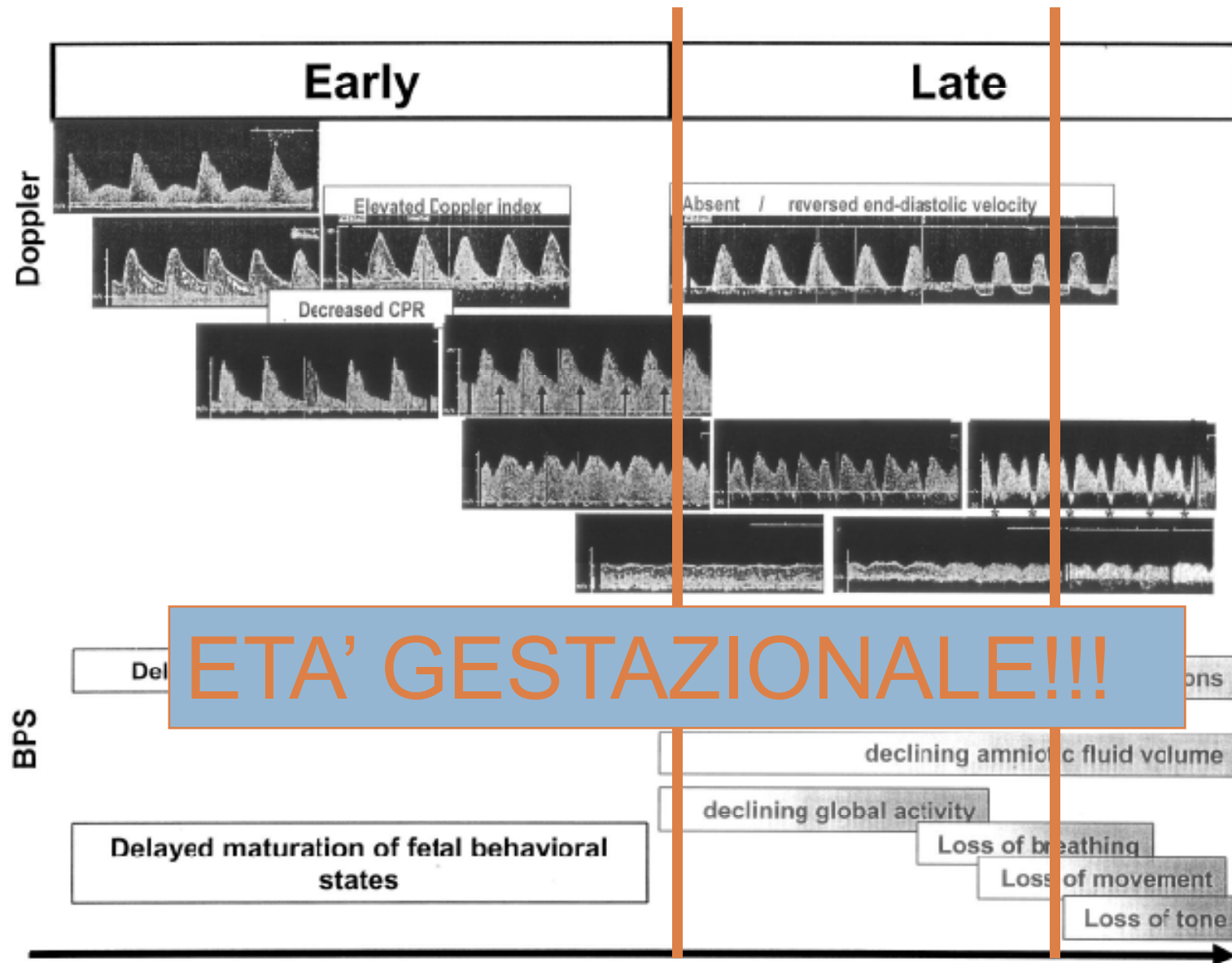


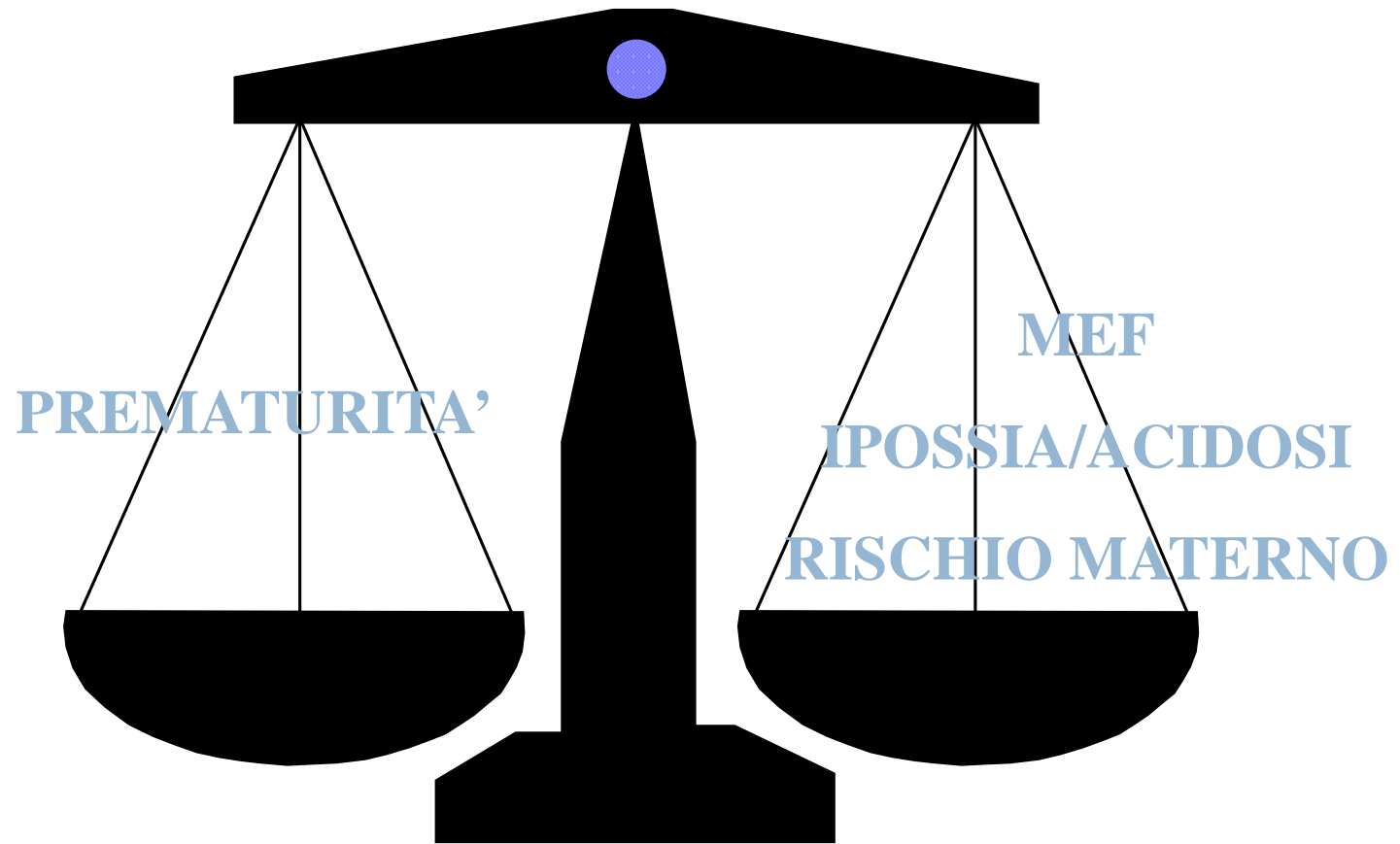
Fig. 2 Summary of the early and late responses to placental insufficiency. Doppler variables in the placental circulation precede abnormality in the cerebral circulation. Biophysical parameters (BPS) are still normal at this time, and computerized analysis of fetal behavioral patterns is necessary to document a developmental delay. With progression to late responses, venous Doppler abnormality in the fetal circulation is characteristically often preceding the sequential loss of fetal dynamic variables and frequently accompanying the decline in amniotic fluid volume. The asterisk (\*) in the ductus venosus flow velocity waveform marks reversal of blood flow during atrial systole (a-wave). The decline in biophysical variables shows a reproducible relationship with acid base status. If adaptation mechanisms fail, stillbirth ensues.

# MANAGEMENT DELL'IPERTENSIONE IN GRAVIDANZA



- Trattamento dell'ipertensione
- Rischio materno
- Rischio fetale
- **Modalità di parto**

## PARTO: QUANDO? COME?



IPERTENSIONE CRONICA O  
GESTAZIONALE BEN  
CONTROLLATA SENZA SEGNI  
DI COMPROMISSIONE  
CARDIO-CIRCOLATORIA O  
DANNO D'ORGANO



CONDUZIONE  
OSTETRICA DI  
ROUTINE

PREECLAMPSIA



ESPLETAMENTO DEL PARTO

TRATTAMENTO  
CONSERVATIVO

## PREECLAMPSIA GRAVE SLOG 2003

- PA  $\geq$  160/110 mmHg
- PA  $<$  160/110 mmHg associata ad uno a più dei seguenti segni:
  - proteinuria  $>$  5g/24 h
  - oliguria, insufficienza renale acuta
  - edema polmonare acuto
  - rialzo transaminasi, ascite
  - piastrinopenia  $<$  100000
  - epigastralgia, dolore a barra
  - cefalea, disturbi visivi
  - DIC

# PREECLAMPSIA GRAVE: INDICAZIONI A PARTO IMMEDIATO

## SLOG 2003

### FETALI

**Stabilizzazione**

**Mantenimento di PA < 160/110**

**Profilassi con MgSO<sub>4</sub>**

**Idratazione (< 120 ml/h)**

**Desametasone (HELLP)**

**Correzione coagulopatia (FFP, ATIII)**

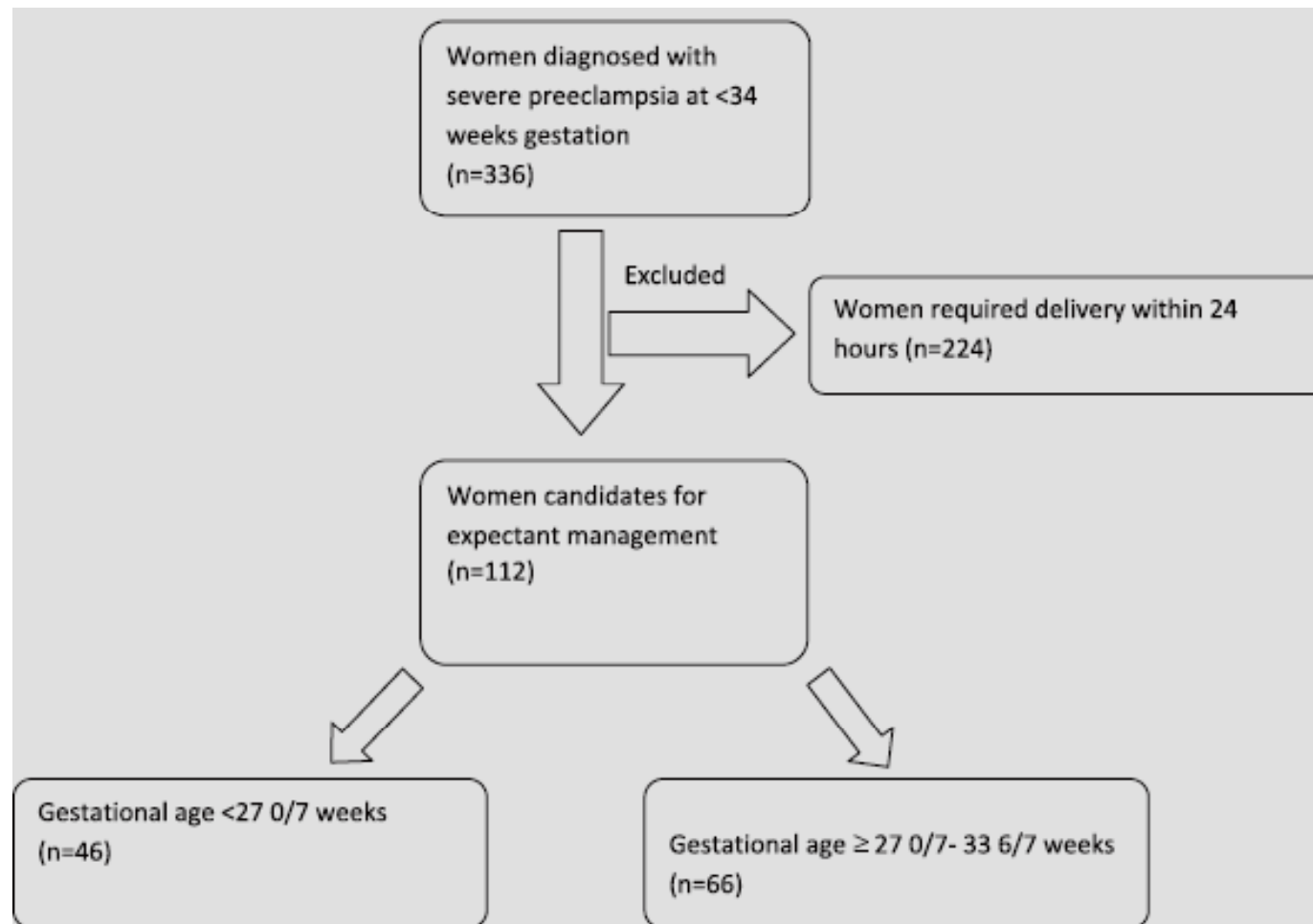
- AED o RED flow
- MEF

### MATERNE

- insufficienza renale acuta
- Disturbi neurologici
- Piastrinopenia < 10<sup>5</sup>
- Dolore epigastrico

# TRATTAMENTO CONSERVATIVO

## Bombrays AE, Sibai BM 2008-2009



*Bombrys. Severe preeclampsia at less than 27 weeks. Am J Obstet Gynecol 2008.*

# TRATTAMENTO CONSERVATIVO

## Bombrays AE, Am J Obstet Gynecol, 2008

< 27 weeks: n=46

TABLE 1

Neonatal and pregnancy outcomes stratified by gestational age at onset of expectant management<sup>a</sup>

Admission GA (wks)	Number of fetuses	Days gained (range)	Delivery GA (wks)	Fetal death, n (%)	Neonatal death, n (%)	Perinatal Survivors, n (%)	Severe RDS, n (%)	CLD, n (%)	IVH, n (%)	NEC, n (%)
21 to 22 6/7	7	3 (2-10)	22.86	7 (100)	0 (0)	0 (0)	NA	NA	NA	NA
23 to 23 6/7	10	4 (3-46)	24.36	2 (20)	6 (60)	2 (20)	1 of 2 (50)	0 (0)	0 (0)	0 (0)
24 to 24 6/7	7	9.5 (3-33)	26.36	1 (17)	1 (17)	5 (71)	6 of 6 (100)	3 of 6 (50)	0 (0)	1 of 6 (17)
25 to 25 6/7	17	6.5 (3-43)	26.57	4 (24)	0 (0)	13 (76)	11 of 13 (85)	5 of 13 (38)	1 of 13 (8)	1 of 13 (8)
26 to 26 6/7	10	7 (3-41)	27.71	0 (0)	1 (10)	9 (90)	6 of 9 (67)	1 of 10 (10)	0 (0)	1 of 10 (10)
Total	51	6 (2-46)	26.29	14 of 51 (27)	8 of 51 (16)	29 of 51 (57)	24 of 37 (65)	9 of 37 (24)	1 of 37 (3)	3 of 37 (8)

<sup>a</sup> All neonatal complications are based on babies who were born alive after greater than 23 weeks gestation. Bombrays. Severe preeclampsia at less than 27 weeks. Am J Obstet Gynecol 2008.

< 24 weeks: outcome fetale: mortalità perinatale 80%

outcome materno: morbidità grave 65%

TABLE 2

Maternal outcome stratified by gestational age at onset of expectant management

Admission GA (wks)	Number of	HFLP	Abruptio placentae	Pulmonary edema	Renal insufficiency	Eclampsia	Composite outcome
26 to 26 6/7	10	1 (10)	3 (30)	0 (0)	1 (10)	0 (0)	5 (50)
Total	46	11 (24)	6 (13)	2 (4)	2 (4)	1 (2)	21 (46)

These complications developed during expectant management and were the maternal indications for delivery. GA, gestational age.

Bombrays. Severe preeclampsia at less than 27 weeks. Am J Obstet Gynecol 2008.

“Given the high maternal morbidity and extremely low perinatal survival in expectant management at less than 24 weeks, termination of pregnancies should be offered after extensive counseling”

# TRATTAMENTO CONSERVATIVO

Bombrays AE, Am J Perinatol, 2009

27-34 weeks: n=66

≥ 32 weeks: outcome fetale: mortalità perinatale 0

outcome materno: morbidità grave 36%

“Because there is significant maternal morbidity at ≥ 32 weeks with minimal neonatal benefit, consideration should be given for delivery of these pregnancies following corticosteroid administration”

# Early-onset severe preeclampsia: induction of labor vs elective cesarean delivery and neonatal outcomes

Mark C. Alanis, MD; Christopher J. Robinson, MD; Thomas C. Hulsey, ScD, MSPH; Myla Ebeling, RA; Donna D. Johnson, MD

FIGURE 1  
Patient selection flow diagram

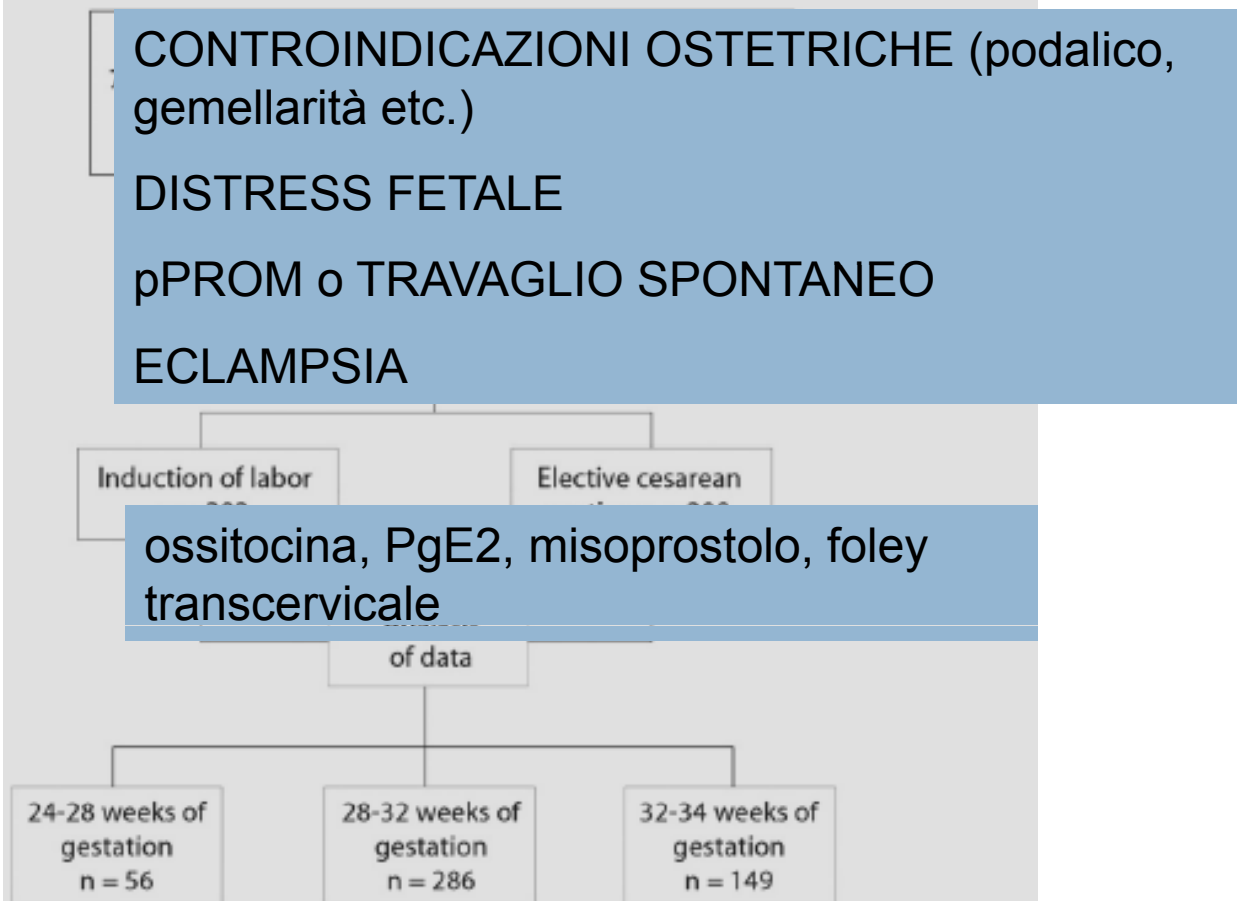


TABLE 1

## Delivery outcomes among 3 clinically relevant groups of gestational age

Gestational age (wk)	Vaginal delivery (n)	Failed IOL with fetal distress (n)	Failed IOL without fetal distress (n)	Elective cesarean delivery (n)
24-28 (n = 56)	1 (1.8%)	7 (12.5%)	7 (12.5%)	41 (73.2%)
28-32 (n = 286)	75 (26.2%)	44 (15.4%)	39 (13.6%)	128 (44.8%)
32-34 (n = 149)	75 (50.3%)	17 (11.4%)	17 (11.4%)	40 (26.9%)

Alanis. Early-onset severe preeclampsia. Am J Obstet Gynecol 2008.

TABLE 3

## Factors that were associated with assignment to and success of IOL

Factor		Assignment to IOL Adjusted OR <sup>a</sup>	95% CI	Successful IOL Adjusted OR <sup>b</sup>	95% CI
Increasing gestational age	→	1.54	1.38-1.72	1.43	→ 1.24-1.66
Nulliparity	→	0.29	0.15-0.55	0.21	→ 0.11-0.42
Previous cesarean delivery		0.01	0.01-0.03	0.09	0.02-0.40
Fetal distress		—	—	0.32	0.18-0.57
HELLP syndrome	→	0.42	0.22-0.82	0.65	→ 0.24-1.79
Cervical dilation >1 cm	→	1.19	0.32-4.37	1.95	→ 0.52-7.38
Small for gestational age	→	0.81	0.48-1.36	0.74	→ 0.39-1.38
Black race		1.31	0.79-2.16	1.78	0.97-3.26
Increasing maternal age		0.97	0.94-1.01	0.94	0.90-0.99

<sup>a</sup> Multivariable analysis was adjusted for gestational age, nulliparity, HELLP syndrome, previous cesarean delivery, cervical dilation >1 cm, small for gestational age, black race, and maternal age.

<sup>b</sup> Multivariable analysis was adjusted for gestational age, nulliparity, HELLP syndrome, previous cesarean delivery, fetal distress, cervical dilation >1 cm, small for gestational age, black race, and maternal age.

Alanis. Early-onset severe preeclampsia. Am J Obstet Gynecol 2008.

TABLE 4

Effects of IOL on neonatal outcomes in women with early-onset severe preeclampsia<sup>a</sup>

Outcome (n)	IOL (n = 282)	Elective cesarean delivery (n = 209)	Adjusted OR	95% CI
Apgar score at 1 minute <7	153 (54.3%)	126 (60.3%)	1.20	0.77-1.86
Apgar score at 5 minutes <7	60 (21.3%)	51 (24.4%)	1.51	0.90-2.00
Neonatal death	7 (2.5%)	18 (8.6%)	1.12	0.38-3.34
Hyaline membrane disease	118 (41.8%)	142 (68.0%)	0.68	0.41-1.13
Bronchopulmonary dysplasia	26 (9.2%)	69 (33.0%)	0.48	0.24-0.97
Transient tachypnea newborn infant	8 (2.8%)	9 (4.3%)	0.32	0.10-1.04
Intracranial hemorrhage	9 (3.2%)	8 (3.8%)	1.91	0.56-6.41
Periventricular leukomalacia	2 (0.7%)	6 (2.9%)	0.73	0.11-4.70
Neonatal seizures	3 (1.1%)	1 (0.5%)	2.32	0.19-27.95
Retinopathy of prematurity	3 (1.1%)	4 (1.9%)	2.72	0.38-19.60
Necrotizing enterocolitis	9 (3.2%)	10 (4.8%)	1.95	0.61-6.27
Neonatal sepsis	44 (15.6%)	66 (31.6%)	0.83	0.48-1.43
Birth injury	7 (2.5%)	1 (0.5%)	5.74	0.62-52.91
Neonatal composite morbidity	145 (51.4%)	159 (76.1%)	0.69	0.41-1.16
Neonatal intensive care unit admission	177 (62.8%)	171 (81.8%)	0.84	0.46-1.51

<sup>a</sup> Multivariable analysis controlled for gestational age, maternal age, black race, corticosteroids, body mass index, and small for gestational age.

Alanis. Early-onset severe preeclampsia. *Am J Obstet Gynecol* 2008.

## CONCLUSIONI

- Condizione potenzialmente letale
- Conseguenze dell'ipertensione prima causa di morte materna, prevenibili!
- Formazione continua degli operatori e adesione a rigidi protocolli clinici
- Considerare un "expectant management" tra 24 e 32 settimane
- Considerare parto vaginale > 32 settimane