Uterine Artery Doppler and N-Terminal Probrain Natriuretic Peptide Levels in the Second Trimester to Predict Poor Perinatal Outcomes

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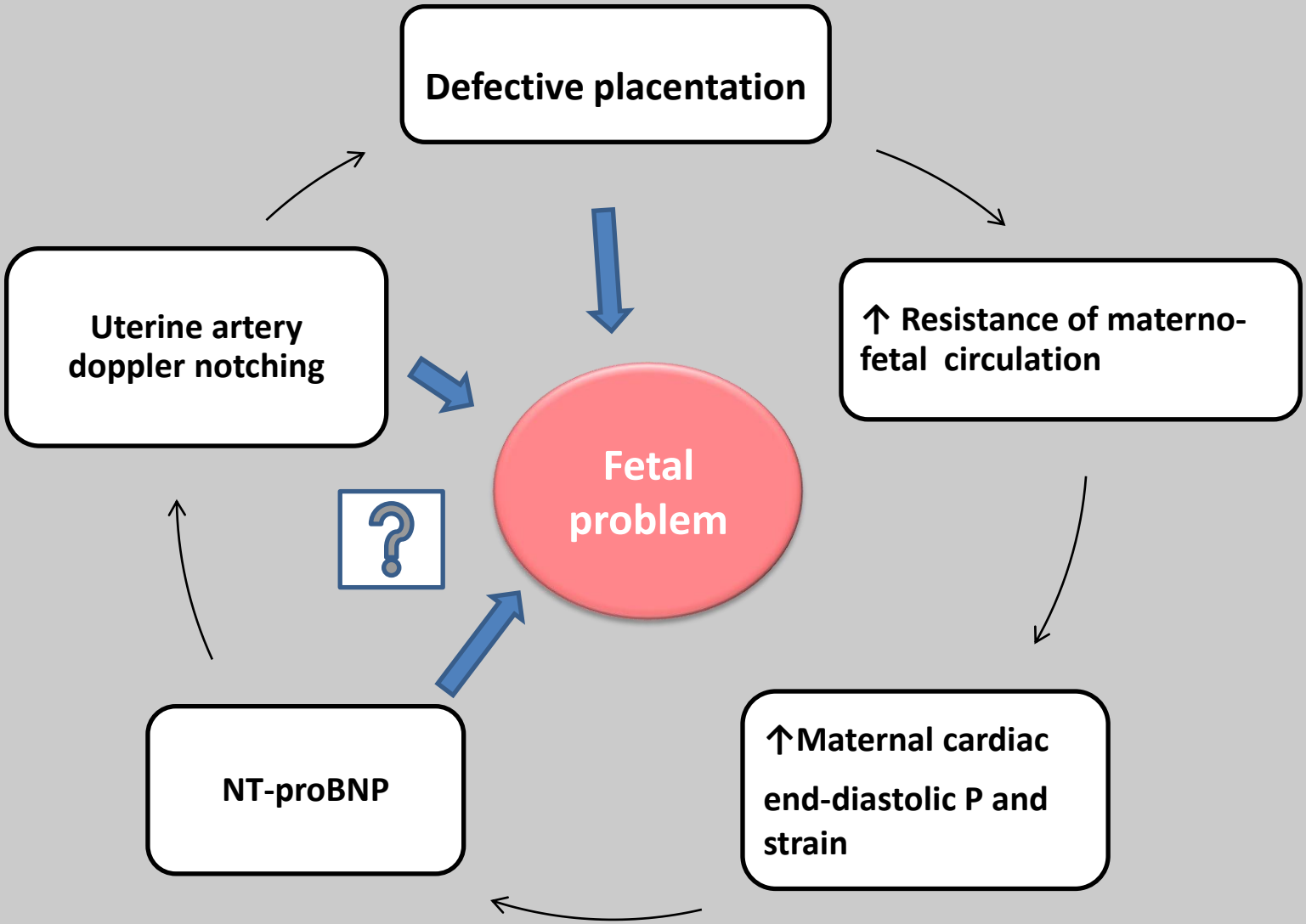
Objective

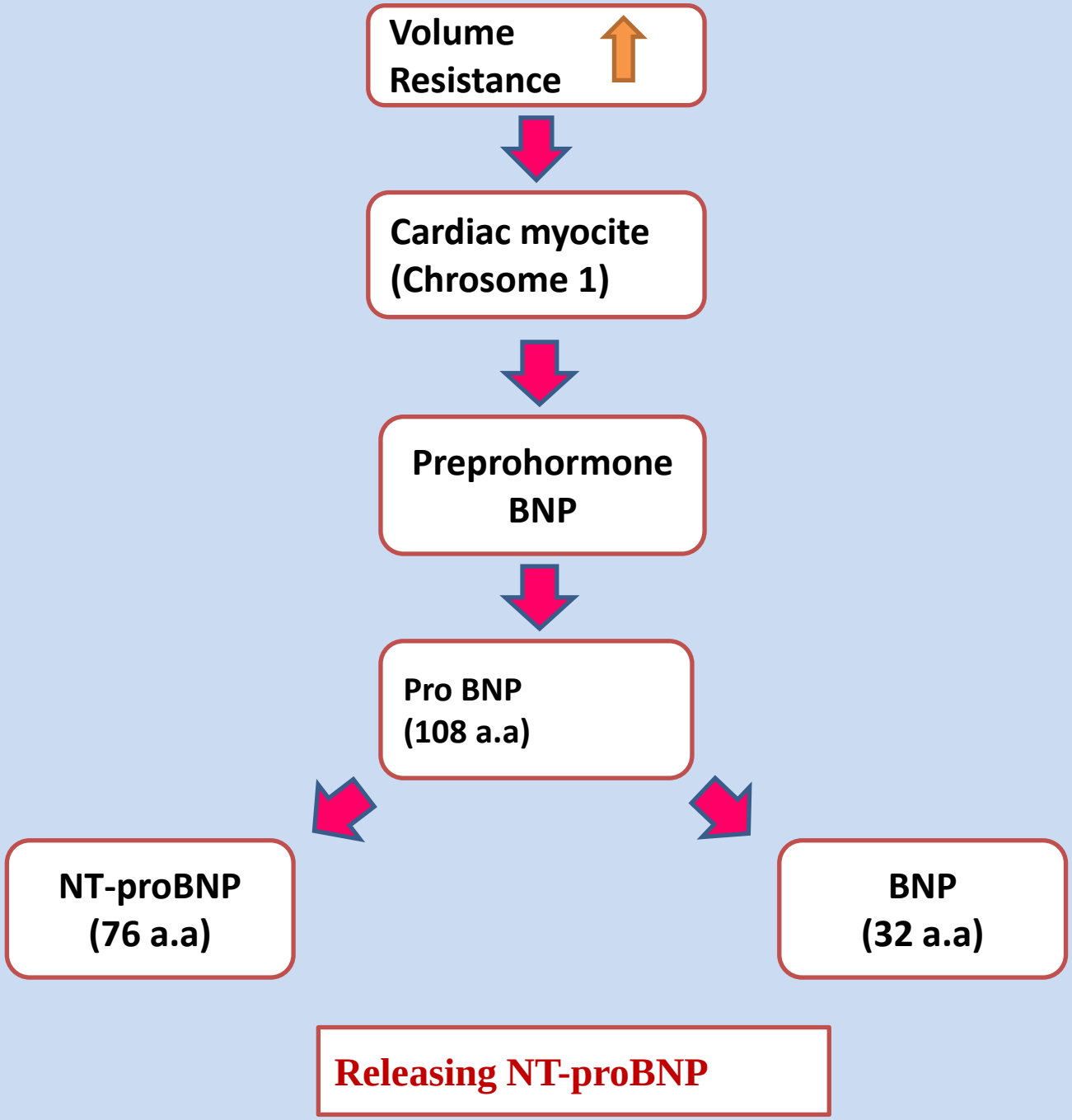
Is it possible to predict poor perinatal outcome with N-terminal probrain natriuretic peptide (NT-ProBNP) level and uterine artery doppler in the second trimester?

Hypothesis


Defective placentation
↑ Resistance of materno-fetal circulation
↑Maternal cardiac end-diastolic P and strain
NT-proBNP
Uterine artery doppler notching
Fetal problem
?

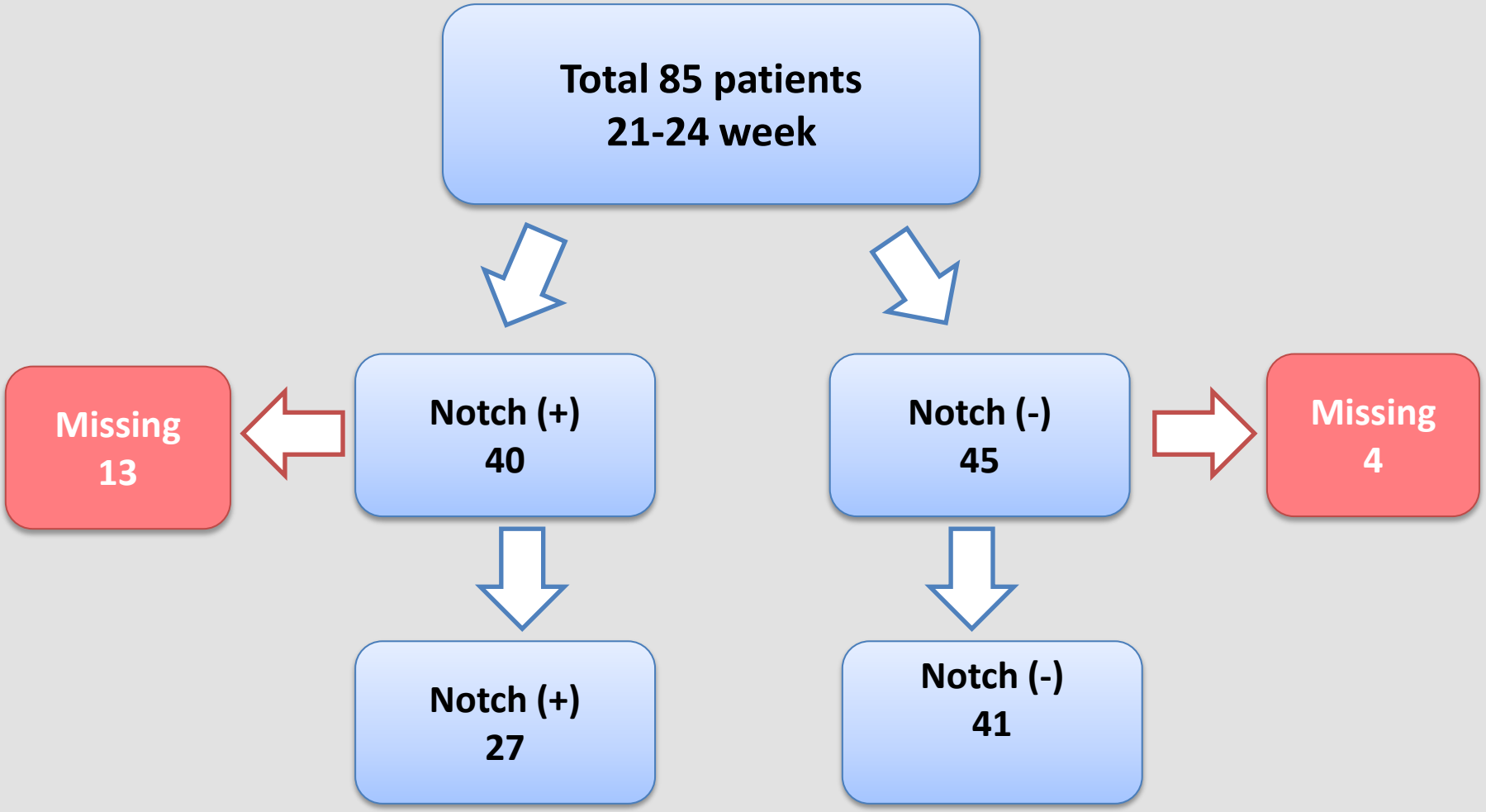
NT-ProBNP

- Cardiac biomarker
- A member of natriuretic peptide family
- Released from cardiac ventricles
- Heart Failure and Acute Coronary Syndrome
- ANP, BNP, CNP, DNP
- Natural antagonist of renin-angiotensin-aldosterone system
- Vasodilatation, diuretic and balance electrolytes


Volume
Resistance
Cardiac myocite
(Chrosome 1)
Preprohormone
BNP
Pro BNP
(108 a.a)
NT-proBNP
(76 a.a)
BNP
(32 a.a)
Releasing NT-proBNP

Methods-1

- Prospective study
- 85 patients included
- 21-24 week gestation
- Fetal anomaly screening and Uterine Artery Doppler
- Notch (+) Group and Notch (-) Group
- Excluding criterias :
  - ***Hypertension**
  - ***Rheumatic and otoimmune diseases**
  - ***Anticoagulant and aspirine use**
  - ***Heart disease**
  - ***DM**

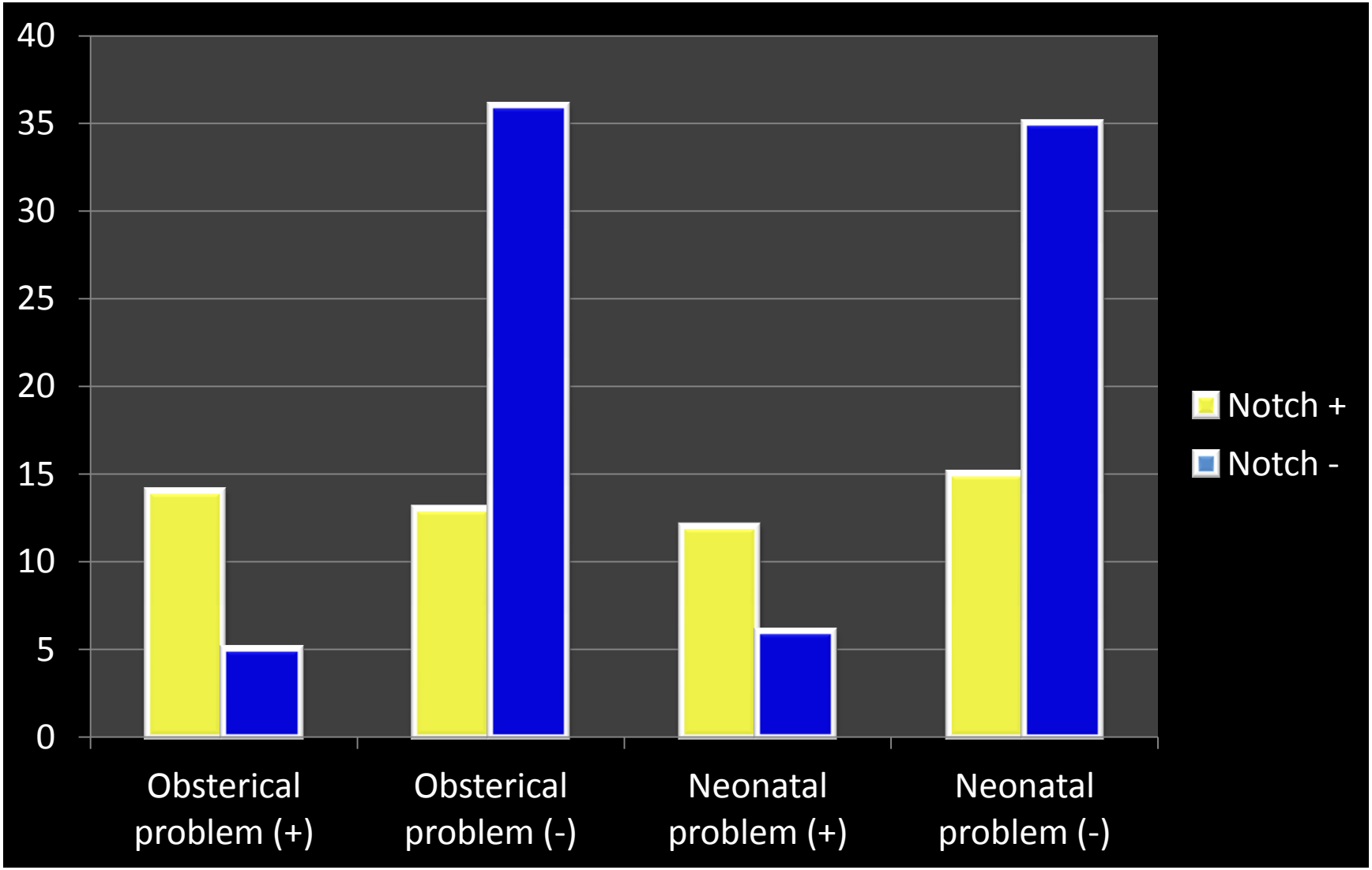

Total 85 patients
21-24 week
Missing
13
Notch (+)
40
Notch (-)
45
Missing
4
Notch (+)
27
Notch (-)
41

Methods-2

- Serum NT-proBNP (VIDAS, NT-proBNP ELFA)
- Complete Urine Test (proteine)
- Biochemical Test (uric acid)
- Blood pressure
- Ultrasonography
- Age, gravida, parity, type of delivery, time of delivery, fetal weight, fetal gender, obstetrical and neonatal problems

Results

	Notch (+) (n=27)	Notch (-) (n=41)	*p* value
Age	28.2±6.2	28.0±5.8	0.922
Gravidity	2.4±1.5	2.2±1.3	0.549
Parity	0.93±0.87	0.98±0.96	0.830
Time of birth (week)	35.6±4.6	38.9±1.3	0.001
Fetal weight (g)	2420.0±891.4	3174.3±480.6	0.001
Uric acid level (mg/dl)	3.5±0.8	3.4±0.6	0.643
NT-ProBNP (pg/ml)	29.8±17.1	37.1±23.4	0.142
Obstetrical Problem	Yes: 14 (51.8%) No: 13 (48.2%)	Yes: 5 (12.1%) No: 36 (87.9%)	0.001
Neonatal Problem	Yes: 15 (55.5%) No: 12 (44.5%)	Yes: 6 (14.6%) No: 35 (85.4%)	0.001
Birth type	NB: 5 (18.5%) C/S: 22 (81.5%)	NB: 21 (51.2%) C/S: 20 (48.8%)	0.006
Fetal gender	Male:17(62.9%) Female:10(37.1%)	Male:23(56.0%) Female:18(44.0%)	0.379


40
35
30
25
20
15
10
5
0
Obsterical problem (+)
Obsterical problem (-)
Neonatal problem (+)
Neonatal problem (-)
Notch +
Notch -

Obstetrical problems

	Notch (+) (n=27)	Notch (-) (n=41)	Total (n=68)
Pre-eclampsia	7 (%25.9)	1 (%2.4)	8 (%11.7)
Ablatio placenta	1 (%3.7)	0	1 (%1.4)
Oligohydramnios	0	1 (%2.4)	1 (%1.4)
GDM	0	1 (%2.4)	1 (%1.4)
GHT	0	1 (%2.4)	1 (%1.4)
PPROM	3 (%11.1)	0	1 (%1.4)
Fetal Distress	3 (%11.1)	1 (%2.4)	4 (%5.8)
Total	14 (%51.8)	5 (%12.2)	19 (%27.9)

PPROM: Preterm Prelabour Rupture of the Membranes, **GDM**: Gestational Diabetes Mellitus, **GHT**: Gestational Hypertension

Neonatal Problems

	Notch (+) (n=27)	Notch (-) (n=41)	Total (n=68)
IUMF	2 (%7.4)	0	2 (%2.9)
MS	2 (%7.4)	2 (%4.8)	4 (%5.8)
SGA	1 (%3.7)	0	1 (%1.4)
Prematurity+RDS	6 (%22.2)	1 (%2.4)	7 (%10.2)
Hypospadias	1 (%3.7)	0	1 (%1.4)
RDS	3 (%11.1)	3 (%7.3)	6 (%8.8)
Total	15 (%55.5)	6 (%14.6)	21 (%30.8)

***IUMF**: Intra Uterine Mort Fetus, **MS**: Meconium Staining **RDS**: Respiratory Distress Syndrome, **SGA**: Small for Gestational Age*

Conclusion

- NT-proBNP- not useful to predict poor perinatal outcome
- No correlation between NT-proBNP and uterine artery doppler notching
- Uterine artery doppler notching predict poor perinatal outcome