

Perinatal Medicine 2019

09-11 MAYIS 2019, Hilton Hotel İzmir, Turkey

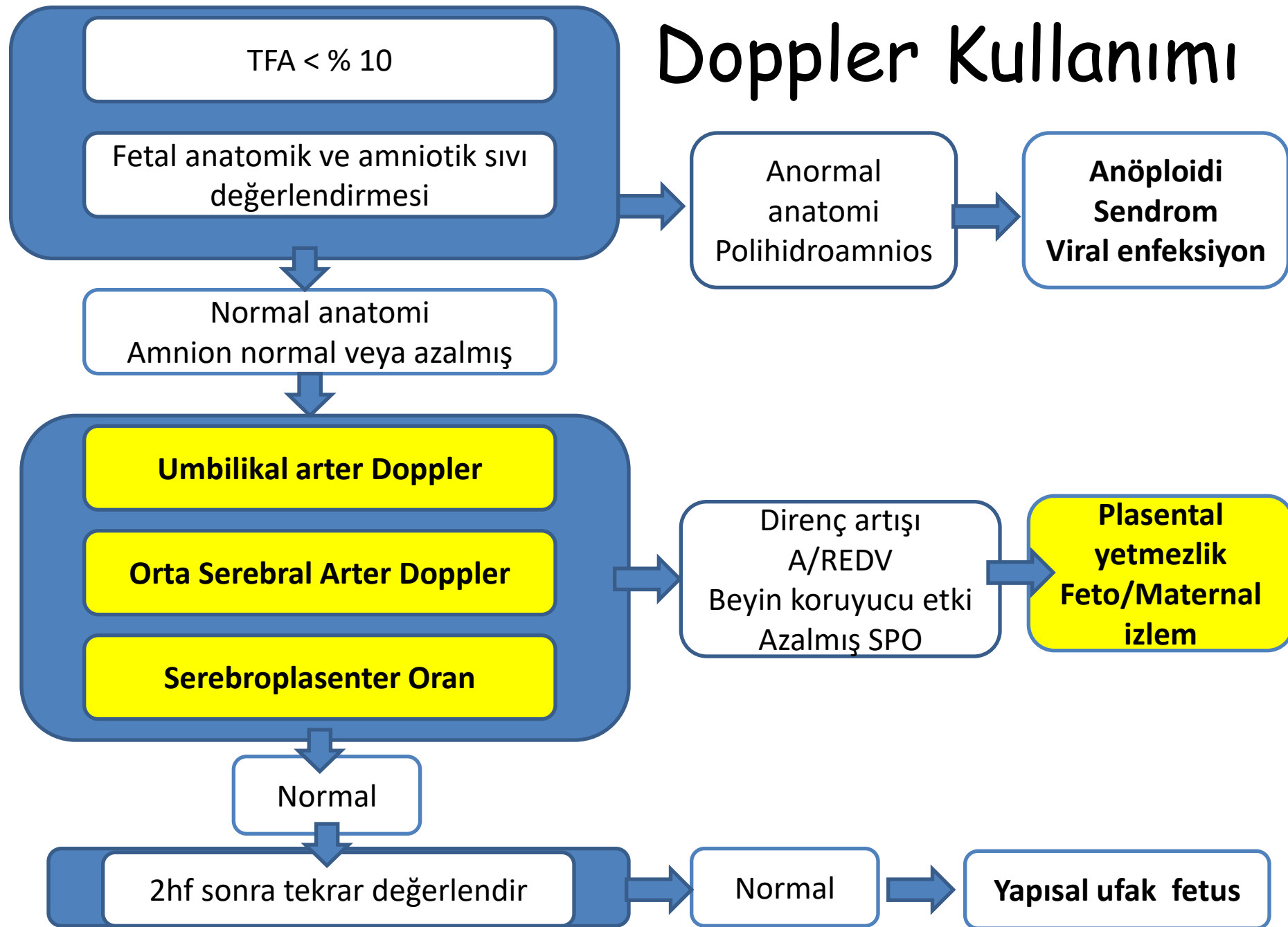


Fetal Büyüme Kısıtlılığı ve DOPPLER İndeksleri; UTERİN, UMBİLİKAL, DUKTUS VENOSUS

Prof.Dr.Sermet SAĞOL

EÜTF Kadın Hastalıkları ve Doğum ABD

Doppler Kullanımı



Fetal Büyüme kısıtlılığı Doğum Endikasyonu

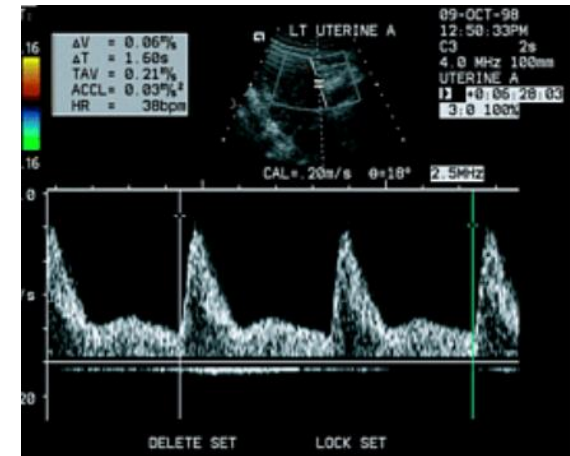
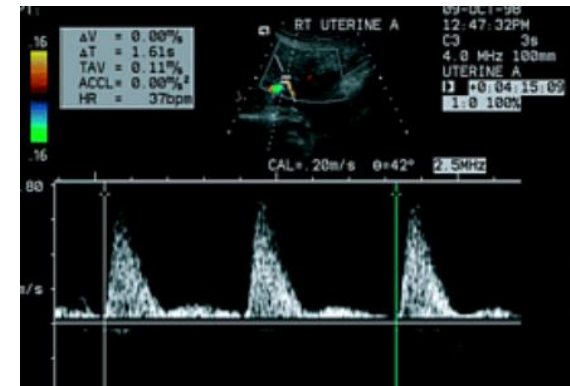
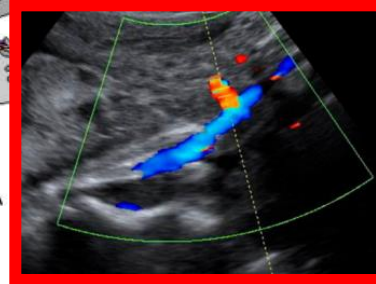
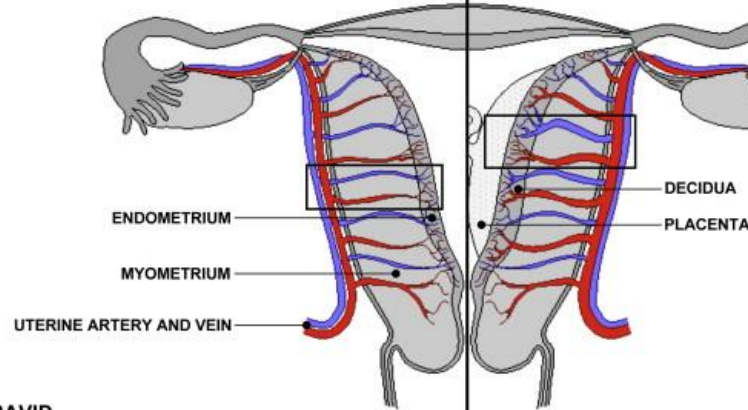
Amaç; fetal distressi tanımlamaktır.

- FKA abnormaliteleri % 39
- **Doppler bulgularında kötüleşme** % 17
- Bifizik profilde kötüleşme % 13
- Spontan doğum % 10
- Maternal Hipertansiyon % 12
- Maternal anksiyete % 5
- Gebelik haftası % 11
- Birden fazla neden % 15

Uterin Arter

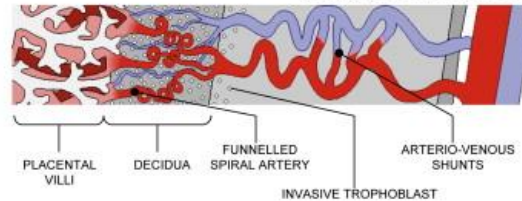
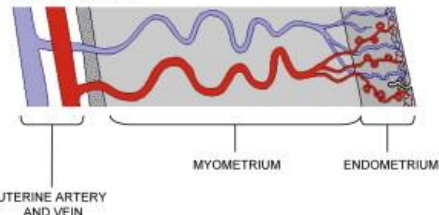
NON-PREGNANT

PREGNANT



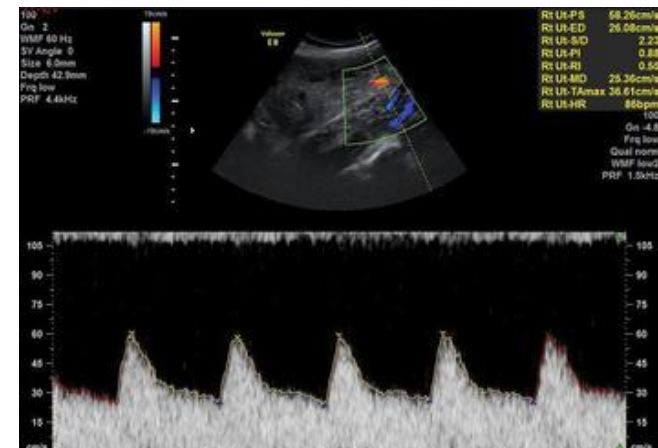
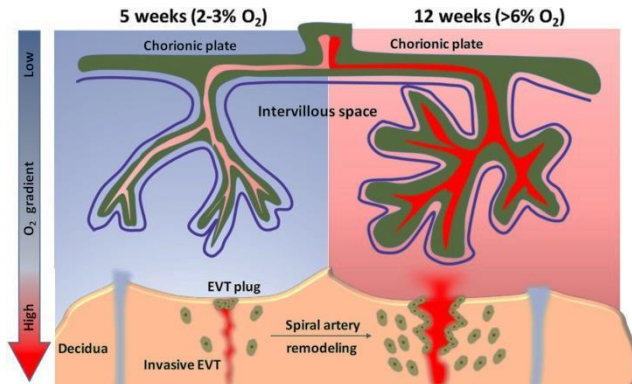
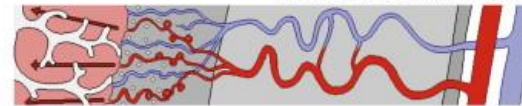
NON-GRAVID

NORMAL PREGNANCY

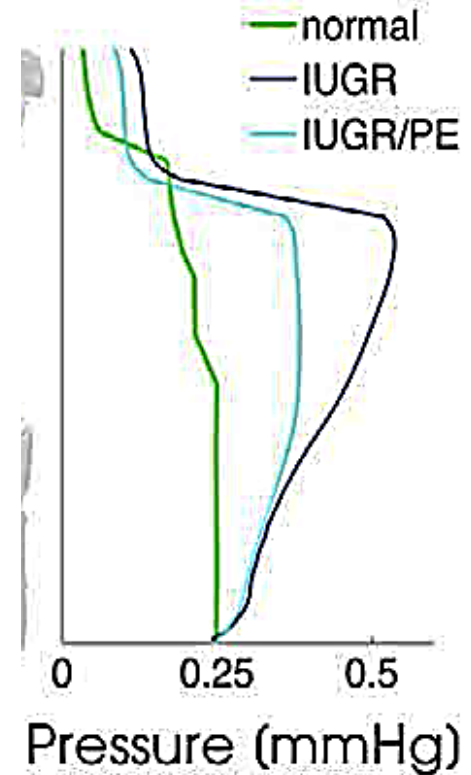
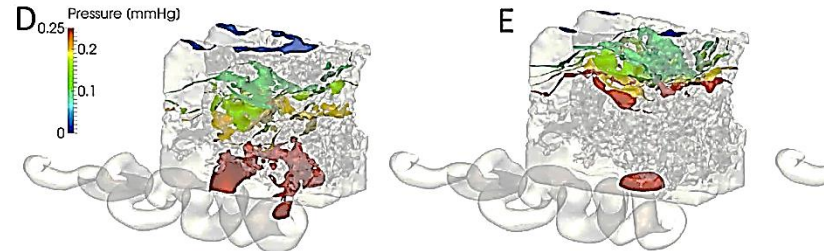
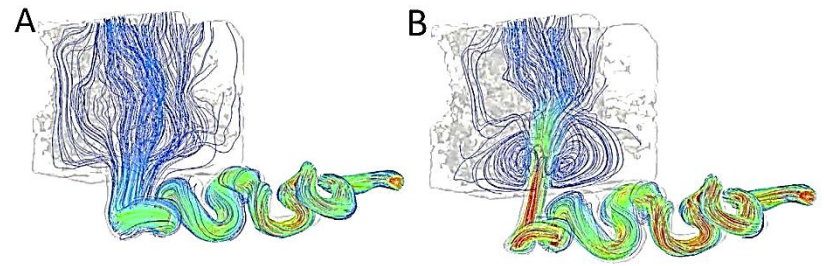
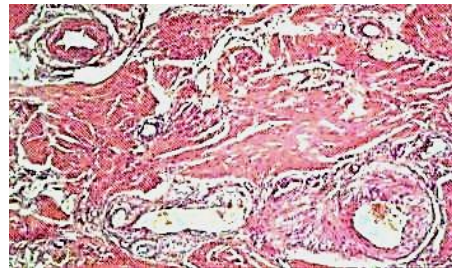
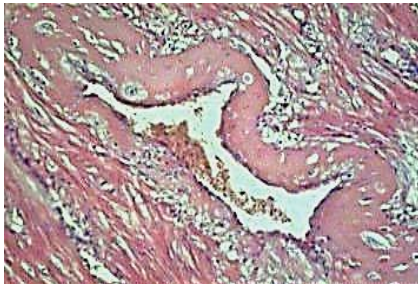
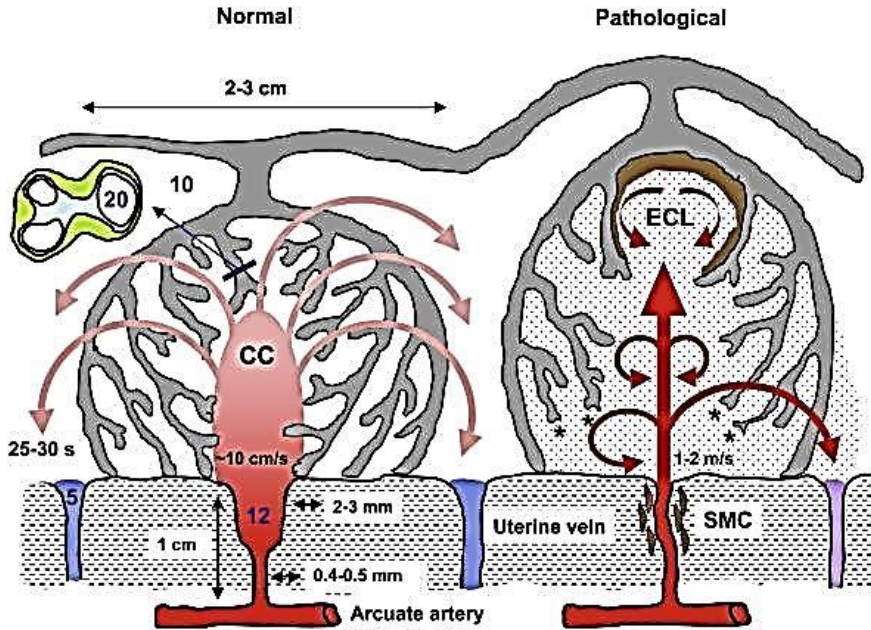
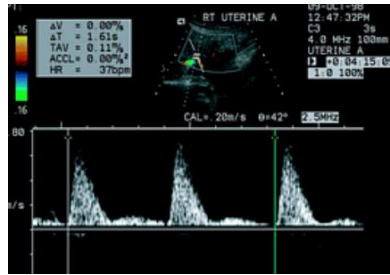
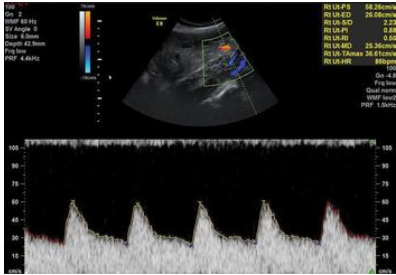


IMMEDIATE POST-PARTUM

SEVERE PREECLAMPSIA



Uterin Arter



Do knowledge of uterine artery resistance in the second trimester and targeted surveillance improve maternal and perinatal outcome? UTOPIA study: a randomized controlled trial

19-22 hf Uterin arter PI > 1.40

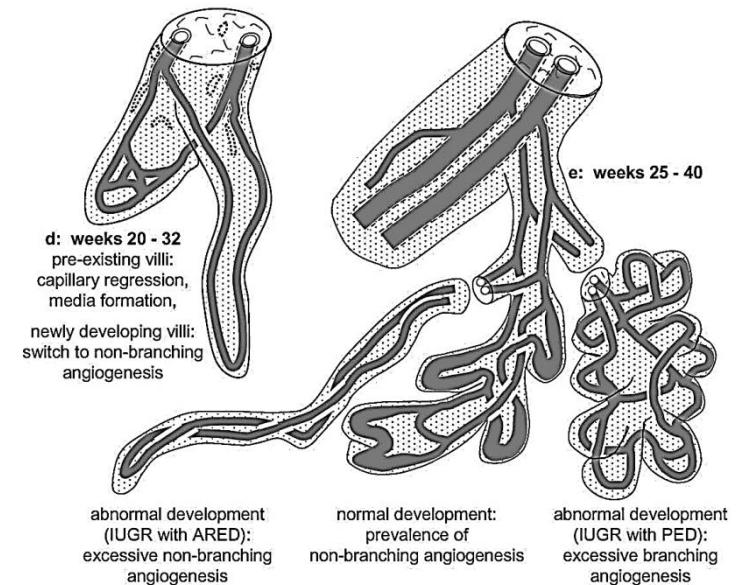
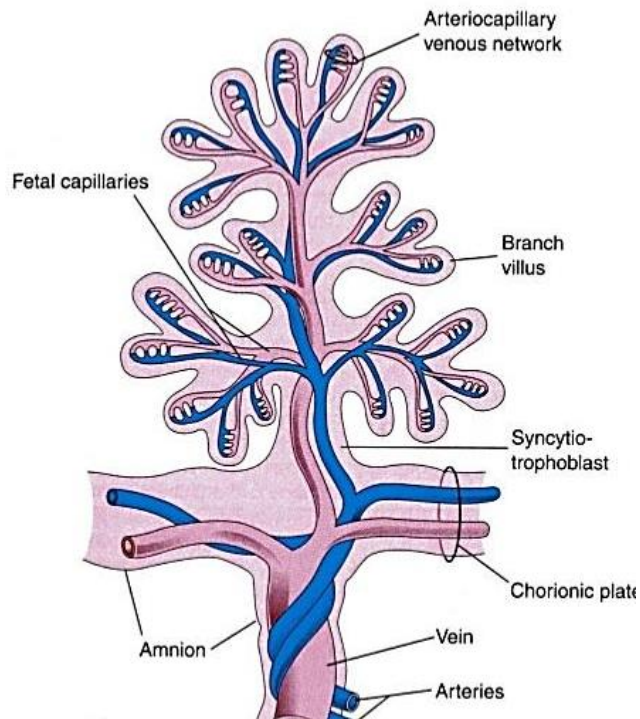
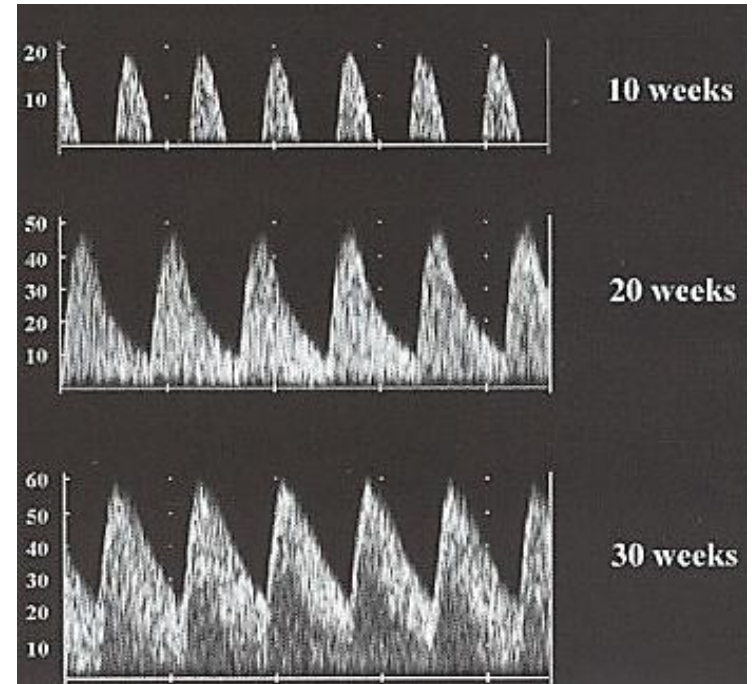
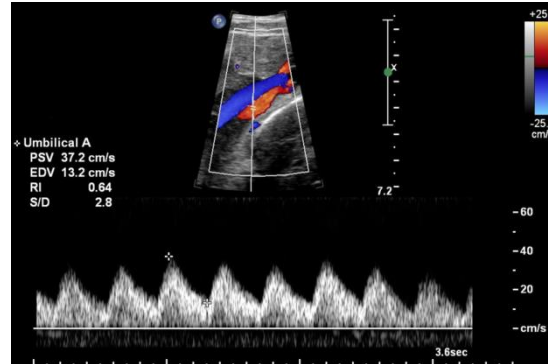
<i>Outcome</i>	<i>UtA-PI ≤ 90th p (n = 5109)</i>	<i>UtA-PI > 90th p (n = 667)</i>	<i>RR (95% CI) or P</i>
GA at screening (weeks)	20 (19.1–22.3)	20.3 (19.2–22.6)	P = 0.15
Pregnancy complication			
PE < 34 weeks	12 (0.2)	17 (2.5)	10.8 (5.2–22.6)
PE ≥ 34 weeks	90 (1.8)	56 (8.3)	4.8 (3.45–6.59)
IUGR < 34 weeks	19 (0.4)	28 (4.2)	11.3 (6.3–20.1)
IUGR ≥ 34 weeks	254 (5.0)	80 (12.0)	2.4 (1.9–3)
Early-onset PE and IUGR	6 (0.1)	9 (1.3)	11.5 (4.1–32.2)

<i>Outcome</i>	<i>Sensitivity (95% CI) (%)</i>	<i>Specificity (95% CI) (%)</i>	<i>LR+ (95% CI)</i>
PE < 34 weeks	58.6 (38.9–76.5)	88.7 (87.8–89.5)	5.18 (3.7–7.1)
PE ≥ 34 weeks	38.4 (30.4–46.7)	89.1 (88.3–89.9)	2.33 (1.7–3.2)
Gestational hypertension	31.0 (19.5–44.5)	88.6 (87.8–89.4)	2.73 (1.8–4.0)
IUGR < 34 weeks	59.6 (44.2–73.6)	88.8 (88.0–89.6)	5.34 (4.2–6.8)
IUGR ≥ 34 weeks	24.0 (19.4–28.9)	89.2 (88.3–90.0)	2.22 (1.8–2.7)
PE and IUGR < 34 weeks	36.2 (28.0–45.7)	89.0 (88.2–89.8)	5.68 (3.9–8.1)
PE and IUGR ≥ 34 weeks	28.3 (24.3–32.6)	89.9 (89.1–90.7)	2.91 (1.6–5.3)
Small-for-gestational age	17.7 (14.0–22.0)	94.1 (93.4–94.7)	1.57 (1.2–2.0)

<i>Outcome</i>	<i>Non-Doppler</i> (n = 5891)	<i>UtA Doppler</i> (n = 5776)	<i>RR (95% CI)</i> <i>or P</i>
PE < 34 weeks	19 (0.3)	29 (0.5)	1.56 (0.87–2.7)
PE ≥ 34 weeks	154 (2.6)	146 (2.5)	0.97 (0.7–1.2)
IUGR < 34 weeks	46 (0.8)	47 (0.8)	1.04 (0.7–1.5)
IUGR ≥ 34 weeks	295 (5.0)	334 (5.8)	1.15 (0.9–1.3)
Neonatal complication			
Composite score for severe neonatal morbidity*	485 (8.2)	494 (8.6)	1.04 (0.9–1.1)
Days in NICU	11.7 ± 0.8	12.4 ± 0.8	P = 0.52
Neonatal mortality	30 (0.5)	33 (0.6)	1.12 (0.7–1.8)
Maternal complication			
Composite score for maternal complications†	111 (1.9)	104 (1.8)	0.96 (0.7–1.2)
Composite score for perinatal complications‡	1419 (24.1)	1417 (24.5)	1.02 (0.9–1.09)

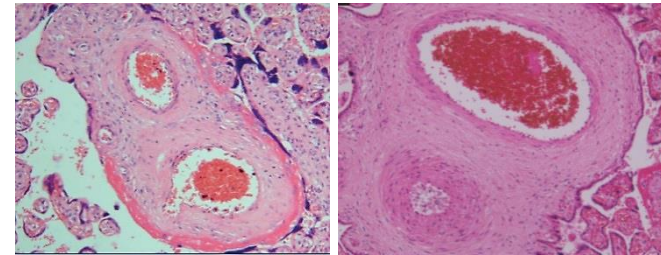
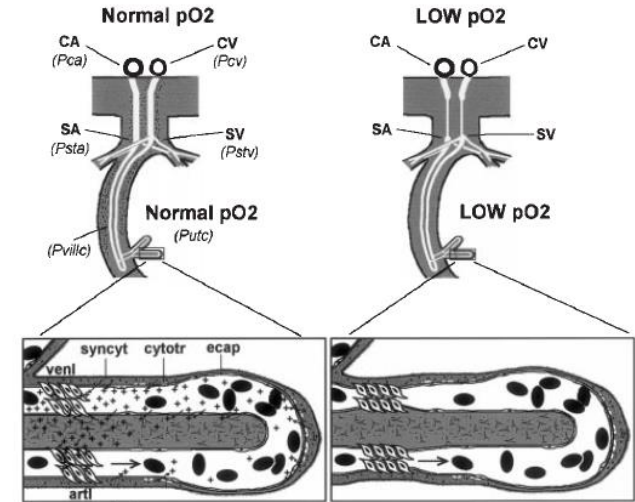
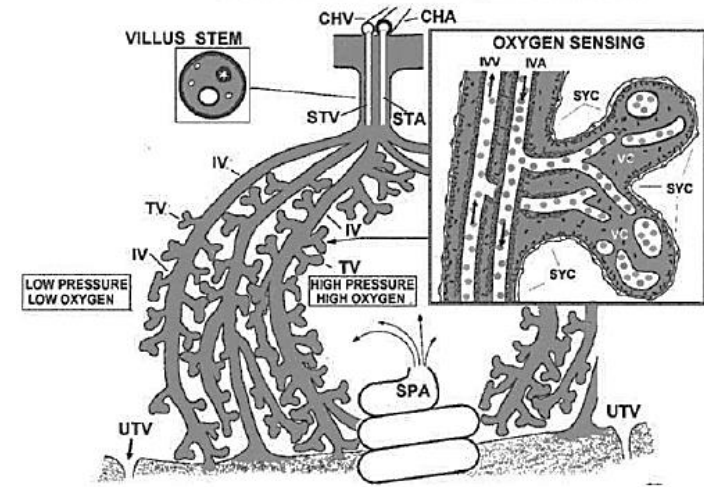
<i>Outcome</i>	Plasental Yetmezlik	<i>Non-Doppler</i> (n = 869)	<i>UtA Doppler</i> (n = 923)	<i>RR (95% CI)</i> <i>or P</i>
Neonatal complication				
Composite score for severe neonatal morbidity*		149 (17.1)	159 (17.2)	1.13 (0.92–1.4)
Days in NICU		19.3 ± 1.8	20 ± 1.7	P = 0.79
Neonatal mortality		30 (3.5)	33 (3.6)	1.17 (0.7–1.9)
Maternal complication				
Composite score for maternal complications†		16 (1.8)	7 (0.8)	0.46 (0.19–1.11)

Umbilical arter

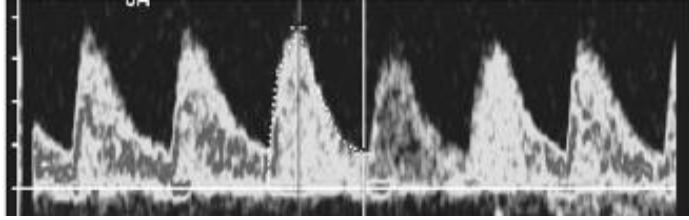


Umbilikal arter ve Plasental Vaskülarizasyon

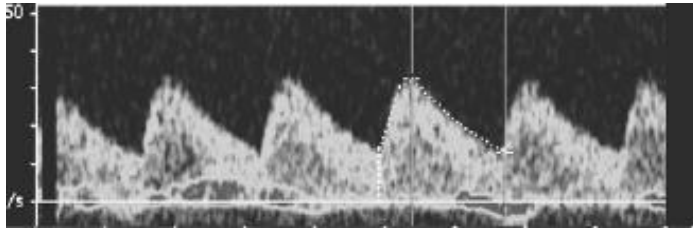
- Direnç artışı için plasenta vasküler alanının % 30'dan fazlası etkilenmeli,
 - Primer villus gelişim bozukluğu
 - Terminal villus damar sayısında (1-2 arter / 7-8 arter) azalma, hipoplastik ve fibrotik.
 - **Utero-plasental akım kaybına sekonder** villuslarda iskemik hasar.
 - Stem villus arteriyel **kronik hipoksik irreversibl** vazokonstriksiyon, duvar kalınlığında artma ve lümen çapında azalma.
- % 70 -80'den fazla arteriyel etkilenme diyastol sonu akım kaybı.



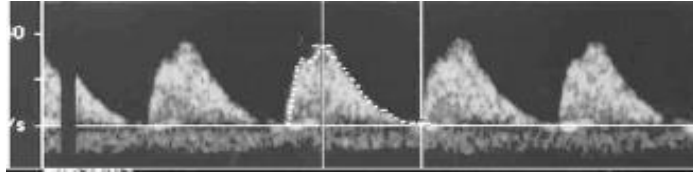
Umblikal Arter Dalga Formları



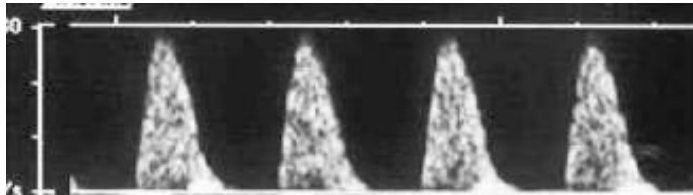
18. hafta normal umblikal arter;
yüksek rezistans, devamlı
diastolik akım



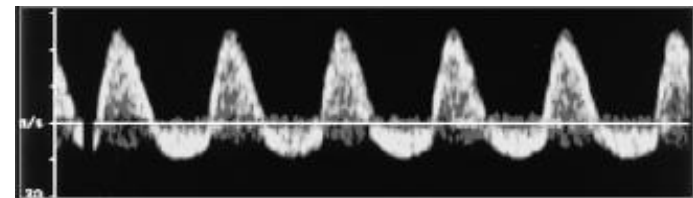
36. hafta normal umblikal arter;
düşük rezistans, devamlı
diastolik akım



Yüksek rezistans, düşük diastolik
akım



End-diastolik akım yokluğu



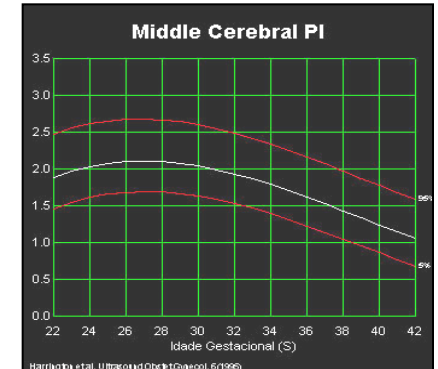
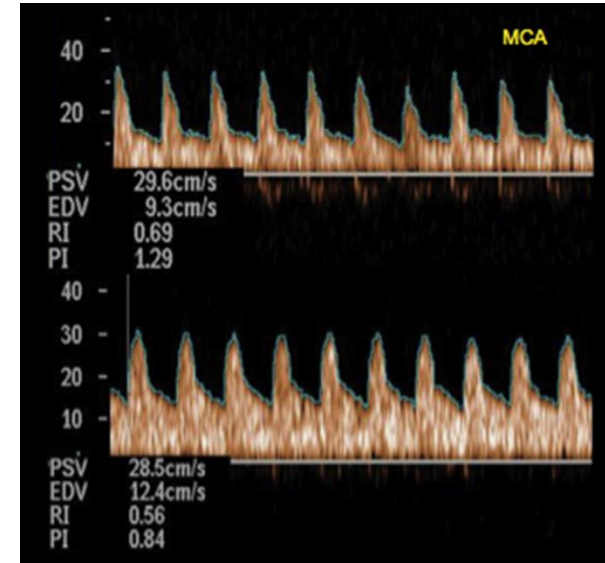
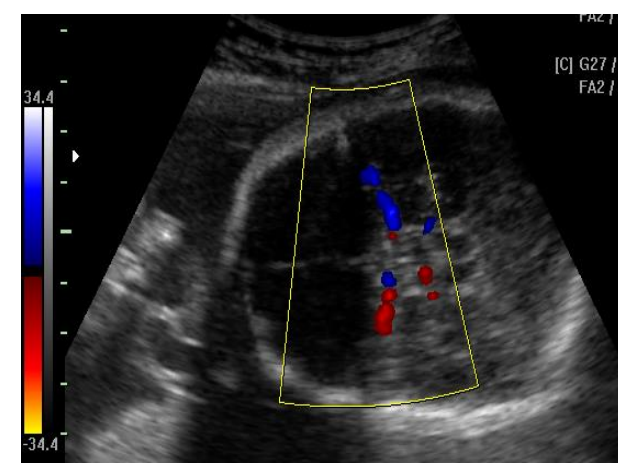
Reversed diastolik akım

Orta Serebral Arter

Saptanması ve tekrarlanabilirliği yüksek.

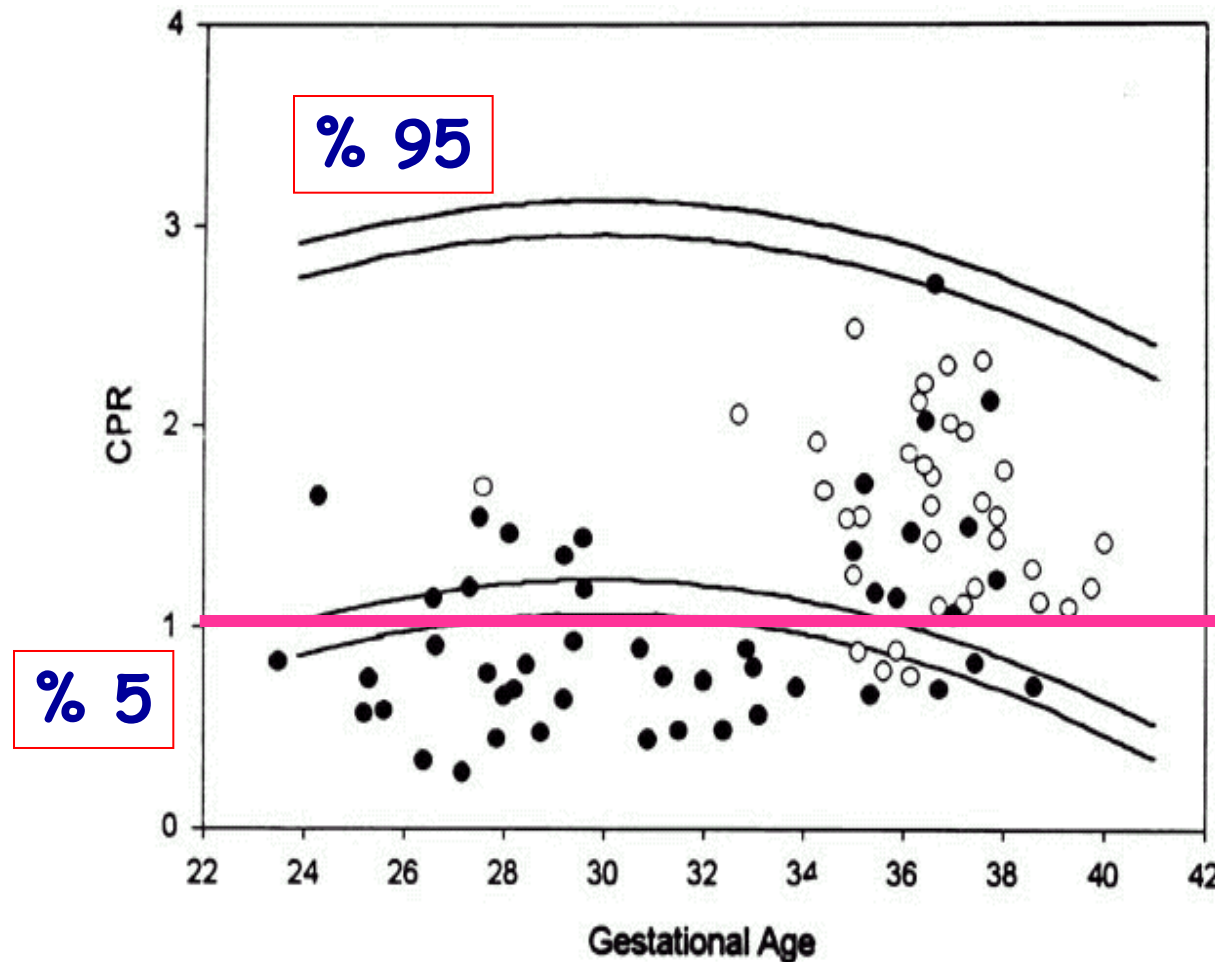
Fetusun hipoksiyi kompanse etmeye çalıştığını gösterir. (Düşük PI)

- Doğumda fetal distress riski yüksektir,
- Düşük umbilikal kord pH ile ilişkili
- Yenidoğan bakım ünitesi ihtiyacı artar
- Nörolojik hasar riski



Serebro / Plasenter oran ve perinatal mortalite/morbidite

- 203 İUGR
(TFA < %10)
- S/U Pİ oranı
- 34 hf ↓ SPO < 5th
Sensit % 73
Spesf % 89.4
(LR 6.9)



Serebro / Plasenter oran ve perinatal mortalite/morbidite

Serebroplasenter Oran	Ölçüm Standartı	Sensit	Spesif	Odds Ratio
< 1	Pulsatility Index (PI)	66%	85%	11.7
< 1	Resistance Index (RI)	66%	84%	11.8
< % 5 (cross-sectional study)	Centile	80%	60%	6.2
< % 5 (longitudinal study)	Centile	85%	41%	4.1

Serebroplasenter Oran

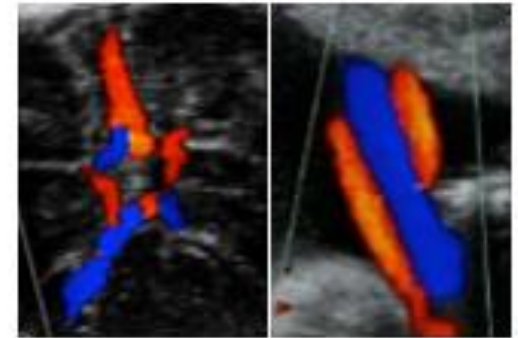
Erken <34hf IUGR

- Doğuda erken gebelik haftası
- Düşük doğum ağırlığı
- Fetal distrese bağlı S/C oranında artış
- 5.dakika Apgar skoru <7
- Yenidoğan asidoz olasılığı
- Yenidoğan yoğun bakım ihtiyacında artma
- Kötü neonatal sonuçlar
- Perinatal ölüm oranında artma

Geç >34hf IUGR

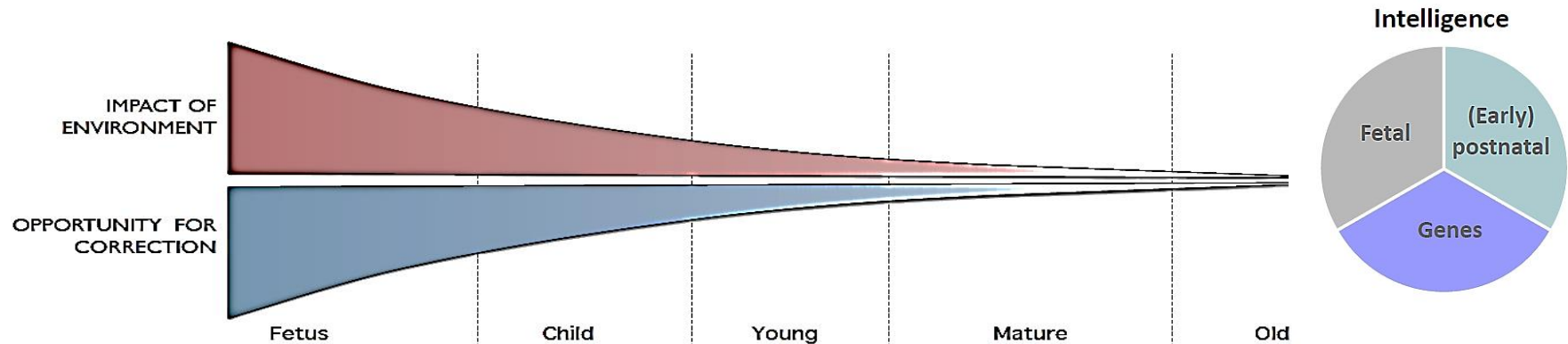
- Doğumda fetal distres olasılığında ve acil S/C gereksiniminde artış
- Düşük Kord Ph düzeyi
- Yenidoğan yoğun bakım ihtiyacında artma

CPR
<p5
(1.35)



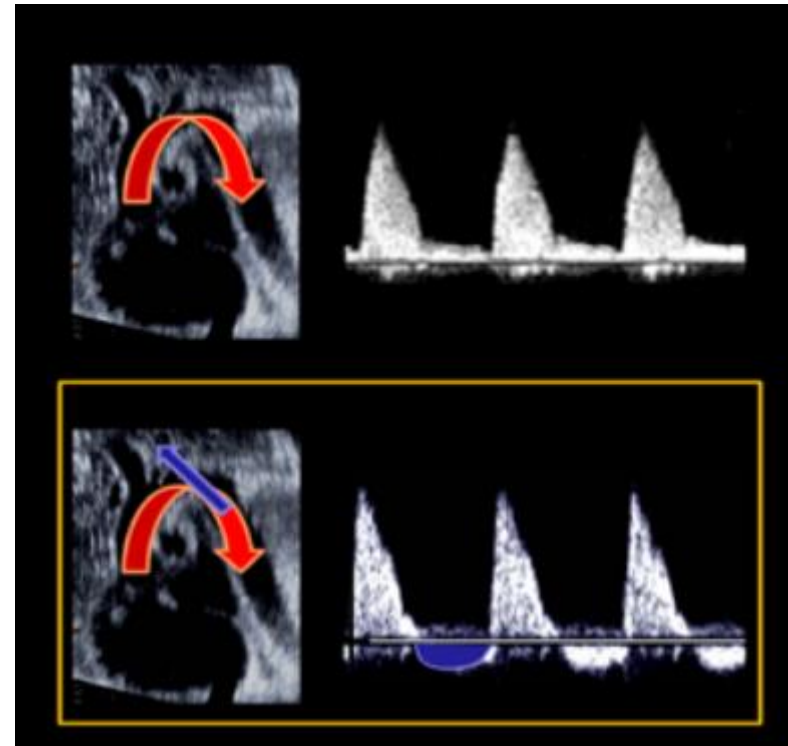
Fetal Hipoksi ve Beyin Hasarı

- Fetal hipoksi belirlenebilir.
- Ancak mevcut testler ile beyin hasarına yol açmayacak hipoksi seviyesi veya süresini belirlemek mümkün değildir.
- Tüm testler kronik fetal hipoksi varlığında doğumun optimal zamanlamasını sağlamayı amaçlar.
- Bu izlem süreci sonucu.
 - Fetusun hipoksiden etkilenme süresi uzar.



Torasik/İstmik Aorta

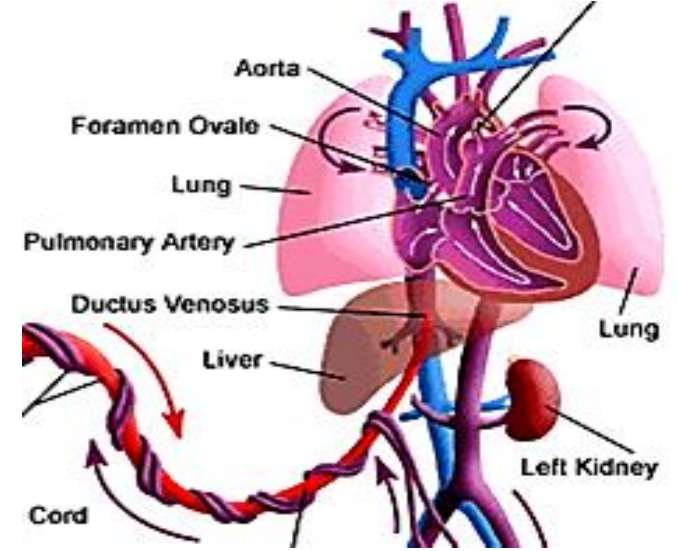
- Aorta akımları UA ve OSA”den sonra bozulmaktadır.
- Aorta akımları anormal ise DV akımlarındaki bozulma kısa sürede gerçekleşmektedir (4 / 14 gün).
- Diyastolde ters akım düşük oksijenli kanın Beyin/Kalbe yönelmesine neden olmaktadır.**



FETAL DOLAŞIMIN ADAPTASYONU

'KARDİAK FONKSİYON'

- Serebral vazodilatasyon; sol ventrikül atım sonrası yük azalır.
- Plasental direnç artışı; sağ ventriküler atım sonrası yük artar.
- Artan vizkozite ventriküler ön yüklemeyi etkiler.
- Hipoksinin artması / ATP tükenmesi; kardiyak kasılma yeteneğini azaltır.

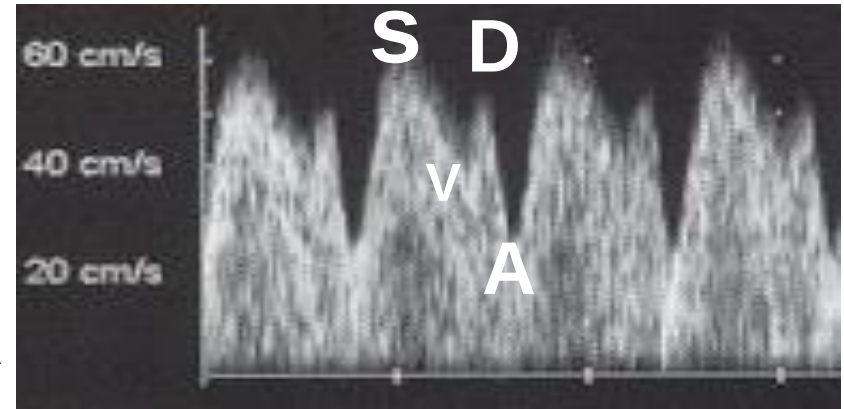
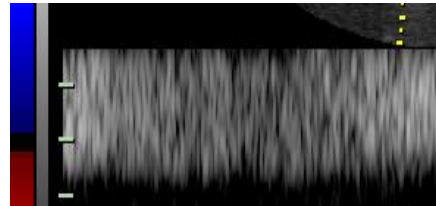
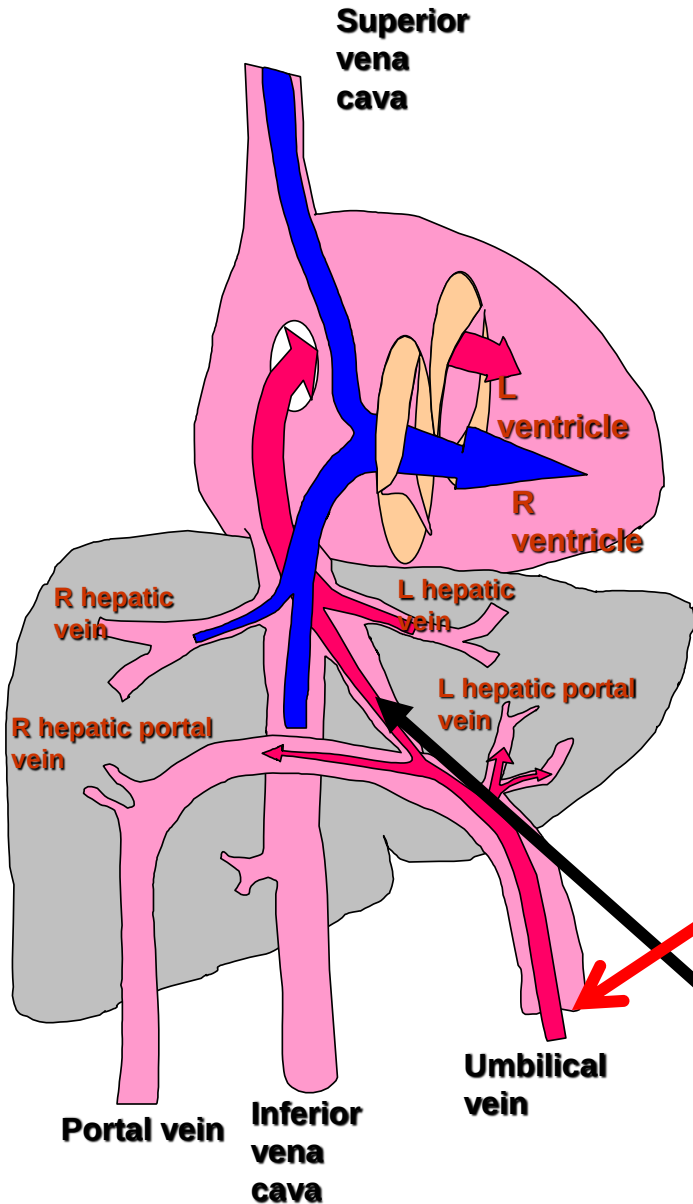


**VENÖZ AKIM NORMAL İSE FETÜS
KOMPANSE EVREDEDİR.**

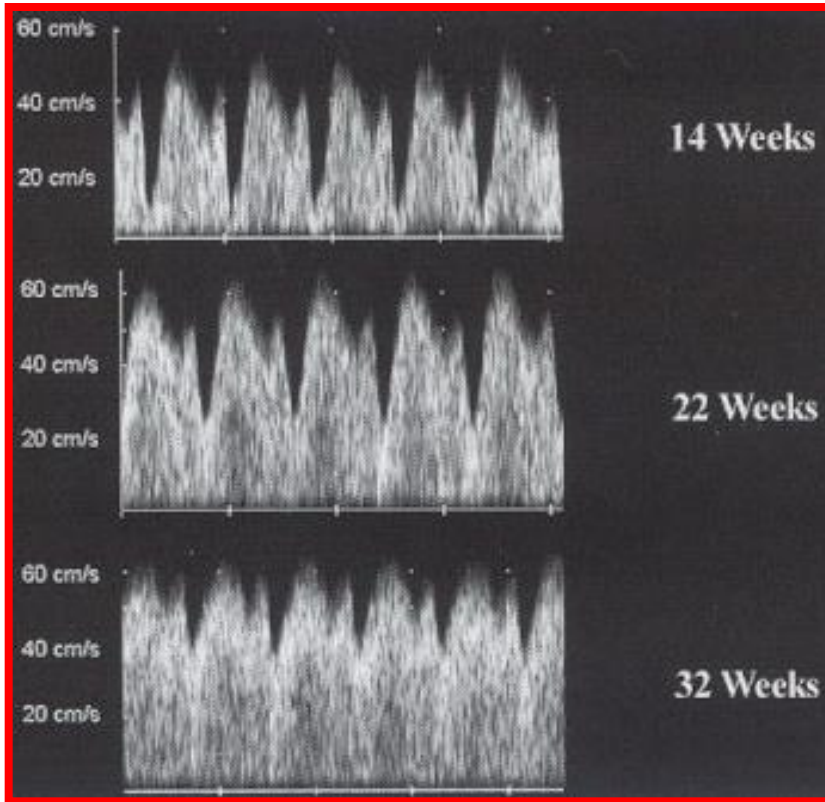
**VENÖZ AKIM ANORMAL İSE
KOMPANZASYON MEKANİZMALARI ÇALIŞMAMAKTADIR.**

Duktus Venosus

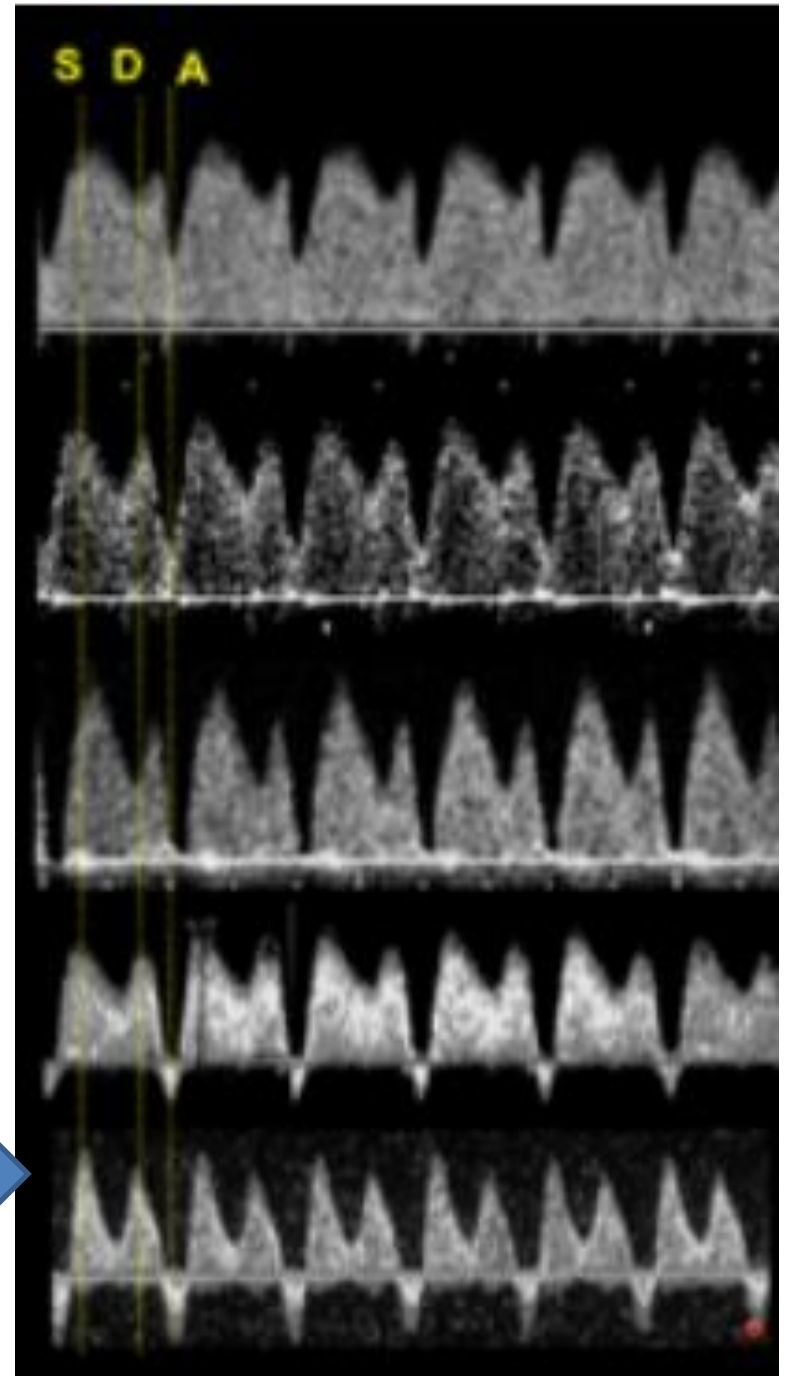
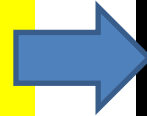
- Umbilikal venden çıkar
- UV'in düz akımı DV'da pulsatil karakter kazanır.
- UV kanın %25'i DV ile kalbe yönelir



Duktus Venosus

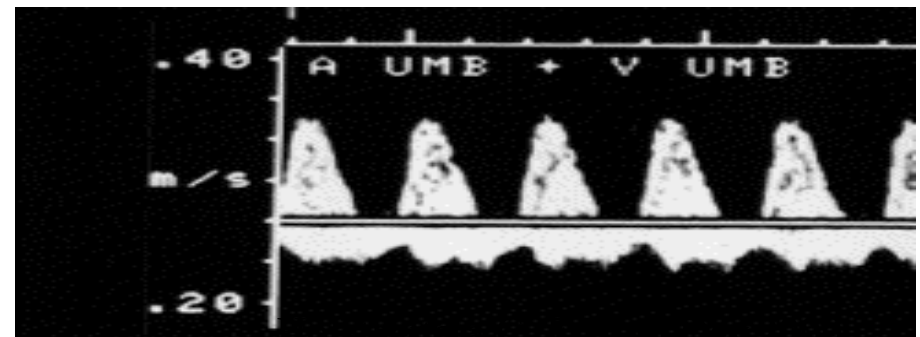
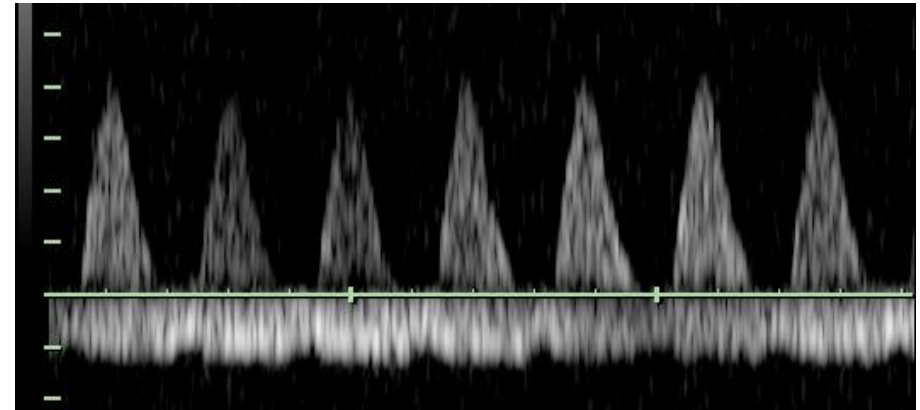
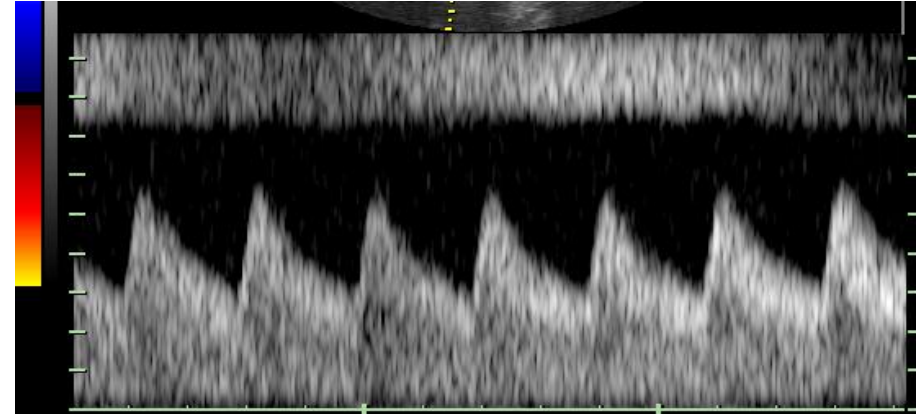
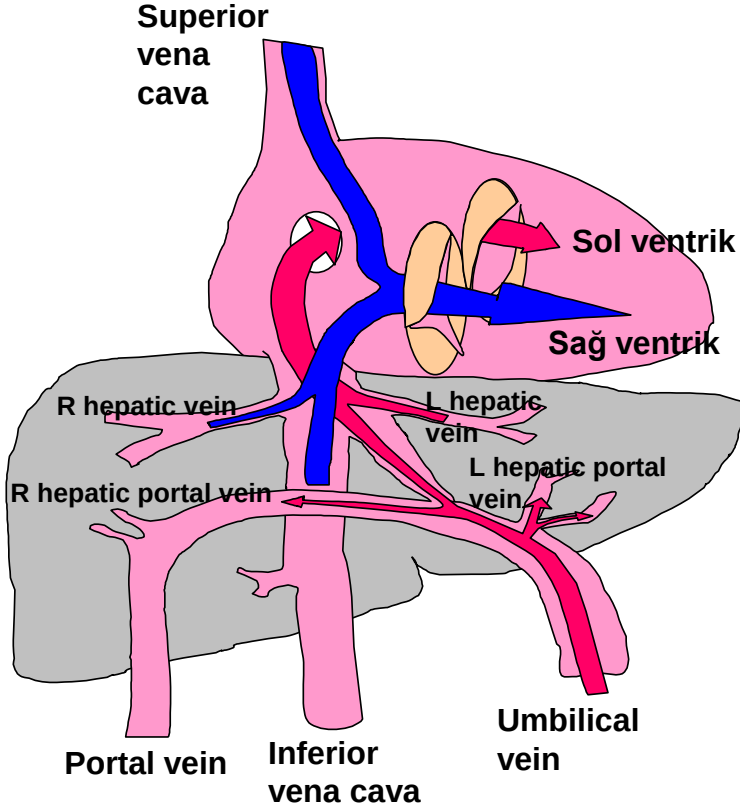


Pre-terminal Ductus venosus
anormalliğı, retrograd a-dalgası
(kardiak dekompanseasyon)



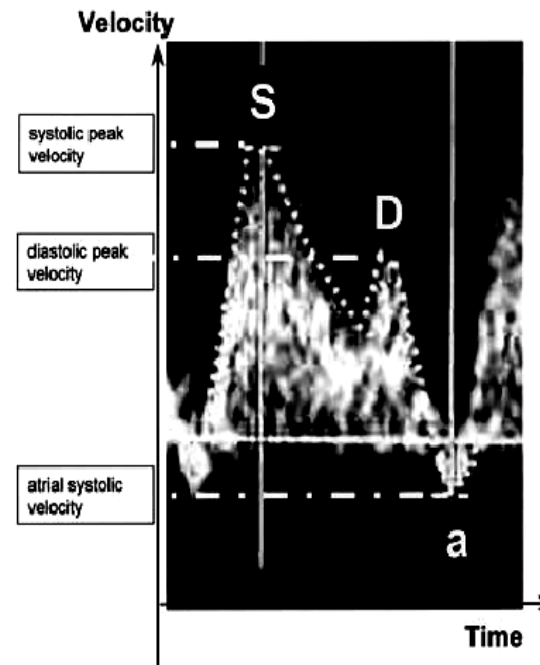
Umbilikal Venöz Pulsasyon

Kardiyak yetmezlik
Asfiksi (asidoz)
Kord oklizyonu



Fetal Asidoz ve Venöz Sistem

Baschat AA, Am J Obst Gynecol, 2004



Inferior vena cava

Preload index = a/S

Ductus venosus

Preload index = $(S-a)/S$

S/A ratio = S/a

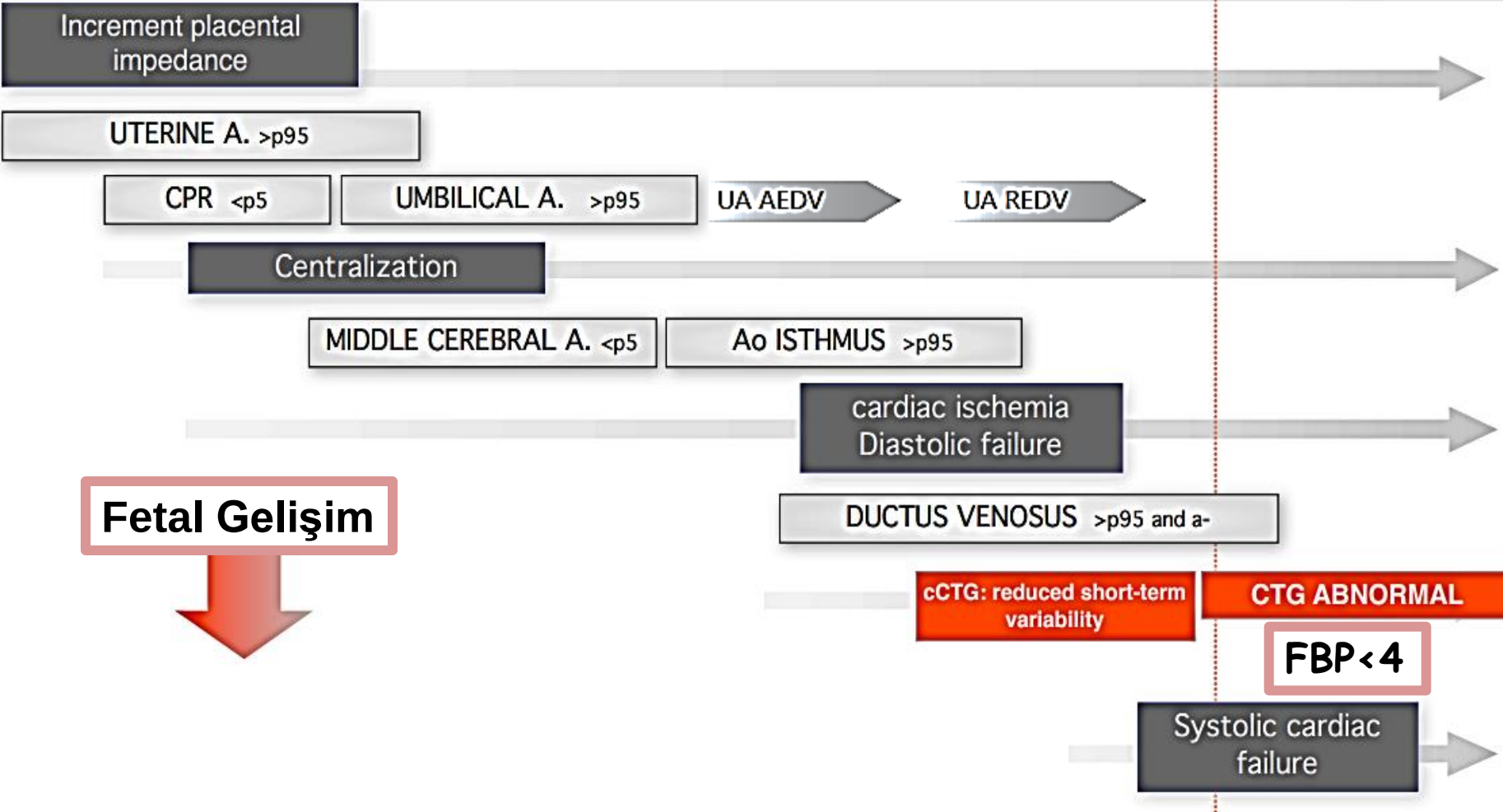
Both vessels

Peak velocity index = $(S-a)/D$

Pulsatility index = $(S-a)/TAMX$

Doppler result	N	pH < 7.20 (n=36)	Sens	Spec	PPV	NPV	Test efficiency	LR (95% CI)	P-value
IVC PLI	65	25	74	49	39	82	57	1.9 (1.1-3.4)	.0371
IVC PIV	60	26	76	57	43	85	59	2.4 (1.3-4.6)	.0018
DV PLI	48	20	56	66	42	77	63	1.4 (1.1-2.2)	.0410
DV S/a	46	21	58	70	46	80	66	1.7 (1.1-2.5)	.0045
DV RAV	9	6	17	96	67	52	72	4.6 (1.2-17.2)	.0217
UV pulsations	44	22	61	74	50	82	70	1.9 (1.3-2.9)	.0003

Plasental Hastalık	Kompanse Hipoksi	Dekompanse Hipoksi	Ciddi Hasar Ölüm
--------------------	------------------	--------------------	------------------



Fetal Büyüme Kısıtlılığı ve Evreleme

izlem

Doğum

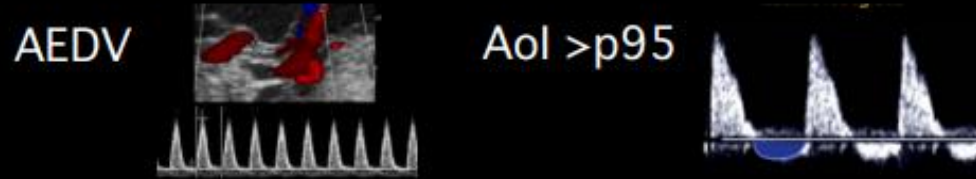
TFA < %3
Orta derecede
plasental yetmezlik



Hf

37

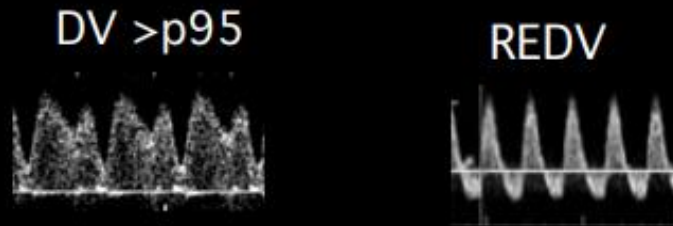
Ciddi plasental
yetmezlik



Hf/2

34
SC

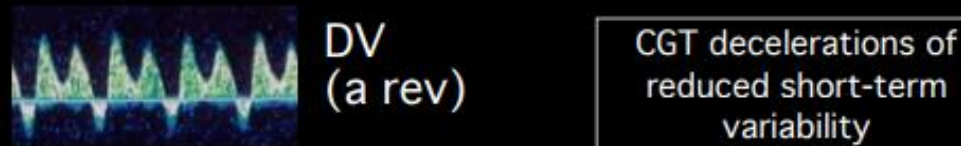
Ciddi hemodinamik
adaptasyon
Fetal asidoz olasılığı
az



1-2g

30
SC

Fetal asidoz olasılığı
yüksek
Fetal ölüm olasılığı
yüksek



12h

26
SC