



Türkiye Milli Pediatri Derneği  
1958



# ÇOCUKLUK ÇAĞINDA HİPERTANSİYON

Prof. Dr. Necla Buyan  
61. Milli Pediatri Kongresi  
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# OLGU:1



- ❧ 15 yaş erkek atlet, şiddetli baş ağrısı nedeniyle başvurdu. Koşarken aralıklı göğüs ağrısı olmuş. 3 yıl önce bir kez KB ölçülmüş. Daha sonra kontrol yapılmamış
- ❧ Öz geçmişi: Özellik yok
- ❧ Soy geçmişi: Babası, halası ve dedesi HT hastası
- ❧ Boy: 173 cm (%75)
- ❧ Ağ: 65 kg (%75)
- ❧ VKİ: 21.7 (%75-85)
- ❧ TA: **160/95 mmHg** (3 ayrı ölçümün ort.) (>133/84 mmHg HT)

# Çocuklar ve Adölesanlarda Hipertansiyon Tanımı



En az 3 ayrı ölçümde elde edilen ortalama

SKB /veya DKB 'nın

Cinsiyet, Yaş ve Boya göre

$\leq 90$  per. Normal kan basıncı

SKB ve/veya DKB'nın  $\geq 95$  per. Hipertansiyon

SKBve/veya DKB'nın 90-95 per. Yüksek-normal KB

J Hypertens. 2016 Oct;34(10):1887-920

# Hipertansiyon Sınıflamaları



☞ **Evre 1 HTN** SKB ve/veya DKB

95 th per – (99th per + 5 mmHg )

☞ **Evre 2 HTN** SKB ve/veya DKB

>99th per.+5 mmHg

**The Fourth Report on the Diagnosis, Evaluation and Treatment of High Blood Pressure in Children and Adolescents. Pediatrics. 2004; 114 (2) : 555-576.**

**Yaş,cinsiyet,boy değerlerine göre hazırlanan KB tabloları**

**2016 European Society of Hypertension guidelines for the management of high blood pressure in children and adolescents. J Hypertens. 2016 Oct;34(10):1887-920**

**TABLE 2. Blood pressure for boys by age and height percentiles**

Age (years)	BP percentile	SBP (mmHg) percentile of height							DBP (mmHg) percentile of height						
		5th	10th	25th	50th	75th	90th	95th	5th	10th	25th	50th	75th	90th	95th
1	90th	94	95	97	99	100	102	103	49	50	51	52	53	53	54
	95th	98	99	101	103	104	106	106	54	54	55	56	57	58	58
	99th	105	106	108	110	112	113	114	61	62	63	64	65	66	66
2	90th	97	99	100	102	104	105	106	54	55	56	57	58	58	59
	95th	101	102	104	106	108	109	110	59	59	60	61	62	63	63
	99th	109	110	111	113	115	117	117	66	67	68	69	70	71	71
3	90th	100	101	103	105	107	108	109	59	59	60	61	62	63	63
	95th	104	105	107	109	110	112	113	63	63	64	65	66	67	67
	99th	111	112	114	116	118	119	120	71	71	72	73	74	75	75
4	90th	102	103	105	107	109	110	111	62	63	64	65	66	66	67
	95th	106	107	109	111	112	114	115	66	67	68	69	70	71	71
	99th	113	114	116	118	120	121	122	74	75	76	77	78	78	79
5	90th	104	105	106	108	110	111	112	65	66	67	68	69	69	70
	95th	108	109	110	112	114	115	116	69	70	71	72	73	74	74
	99th	115	116	118	120	121	123	123	77	78	79	80	81	81	82
6	90th	105	106	108	110	111	113	113	68	68	69	70	71	72	72
	95th	109	110	112	114	115	117	117	72	72	73	74	75	76	76
	99th	116	117	119	121	123	124	125	80	80	81	82	83	84	84
7	90th	106	107	109	111	113	114	115	70	70	71	72	73	74	74
	95th	110	111	113	115	117	118	119	74	74	75	76	77	78	78
	99th	117	118	120	122	124	125	126	82	82	83	84	85	86	86
8	90th	107	109	110	112	114	115	116	71	72	72	73	74	75	76
	95th	111	112	114	116	118	119	120	75	76	77	78	79	79	80
	99th	119	120	122	123	125	127	127	83	84	85	86	87	87	88
9	90th	109	110	112	114	115	117	118	72	73	74	75	76	76	77
	95th	113	114	116	118	119	121	121	76	77	78	79	80	81	81
	99th	120	121	123	125	127	128	129	84	85	86	87	88	88	89
10	90th	111	112	114	115	117	119	119	73	73	74	75	76	77	78
	95th	115	116	117	119	121	122	123	77	78	79	80	81	81	82
	99th	122	123	125	127	128	130	130	85	86	86	88	88	89	90
11	90th	113	114	115	117	119	120	121	74	74	75	76	77	78	78
	95th	117	118	119	121	123	124	125	78	78	79	80	81	82	82
	99th	124	125	127	129	130	132	132	86	86	87	88	89	90	90
12	90th	115	116	118	120	121	123	123	74	75	75	76	77	78	79
	95th	119	120	122	123	125	127	127	78	79	80	81	82	82	83
	99th	126	127	129	131	133	134	135	86	87	88	89	90	90	91
13	90th	117	118	120	122	124	125	126	75	75	76	77	78	79	79
	95th	121	122	124	126	128	129	130	79	79	80	81	82	83	83
	99th	128	130	131	133	135	136	137	87	87	88	89	90	91	91
14	90th	120	121	123	125	126	128	128	75	76	77	78	79	79	80
	95th	124	125	127	128	130	132	132	80	80	81	82	83	84	84
	99th	131	132	134	136	138	139	140	87	88	89	90	91	92	92
15	90th	122	124	125	127	129	130	131	76	77	78	79	80	80	81
	95th	126	127	129	131	133	134	135	81	81	82	83	84	85	85
	99th	134	135	136	138	140	142	142	88	89	90	91	92	93	93
16	90th	125	126	128	130	131	133	134	78	78	79	80	81	82	82
	95th	129	130	132	134	135	137	137	82	83	83	84	85	86	87
	99th	136	137	139	141	143	144	145	90	90	91	92	93	94	94
17	90th	127	128	130	132	134	135	136	80	80	81	82	83	84	84
	95th	131	132	134	136	138	139	140	84	85	86	87	87	88	89
	99th	139	140	141	143	145	146	147	92	93	93	94	95	96	97

BP, blood pressure. Modified from Task Force on High Blood Pressure in Children and Adolescents [7]. Boxed area corresponds to reference values of boys 16 years or older in which the reference values for adults are recommended.

**TABLE 3. Blood pressure for girls by age and height percentiles**

Age (years)	BP percentile	SBP (mmHg) percentile of height							DBP (mmHg) percentile of height						
		5th	10th	25th	50th	75th	90th	95th	5th	10th	25th	50th	75th	90th	95th
1	90th	97	97	98	100	101	102	103	52	53	53	54	55	55	56
	95th	100	101	102	104	105	106	107	56	57	57	58	59	59	60
	99th	108	108	109	111	112	113	114	64	64	65	65	66	67	67
2	90th	98	99	100	101	103	104	105	57	58	58	59	60	61	61
	95th	102	103	104	105	107	108	109	61	62	62	63	64	65	65
	99th	109	110	111	112	114	115	116	69	69	70	70	71	72	72
3	90th	100	100	102	103	104	106	106	61	62	62	63	64	64	65
	95th	104	104	105	107	108	109	110	65	66	66	67	68	68	69
	99th	111	111	113	114	115	116	117	73	73	74	74	75	76	76
4	90th	101	102	103	104	106	107	108	64	64	65	66	67	67	68
	95th	105	106	107	108	110	111	112	68	68	69	70	71	71	72
	99th	112	113	114	115	117	118	119	76	76	76	77	78	79	79
5	90th	103	103	105	106	107	109	109	66	67	67	68	69	69	70
	95th	107	107	108	110	111	112	113	70	71	71	72	73	73	74
	99th	114	114	116	117	118	120	120	78	78	79	79	80	81	81
6	90th	104	105	106	108	109	110	111	68	68	69	70	70	71	72
	95th	108	109	110	111	113	114	115	72	72	73	74	74	75	76
	99th	115	116	117	119	120	121	122	80	80	80	81	82	83	83
7	90th	106	107	108	109	111	112	113	69	70	70	71	72	72	73
	95th	110	111	112	113	115	116	116	73	74	74	75	76	76	77
	99th	117	118	119	120	122	123	124	81	81	82	82	83	84	84
8	90th	108	109	110	111	113	114	114	71	71	71	72	73	74	74
	95th	112	112	114	115	116	118	118	75	75	75	76	77	78	78
	99th	119	120	121	122	123	125	125	82	82	83	83	84	85	86
9	90th	110	110	112	113	114	116	116	72	72	72	73	74	75	75
	95th	114	114	115	117	118	119	120	76	76	76	77	78	79	79
	99th	121	121	123	124	125	127	127	83	83	84	84	85	86	87
10	90th	112	112	114	115	116	118	118	73	73	73	74	75	76	76
	95th	116	116	117	119	120	121	122	77	77	77	78	79	80	80
	99th	123	123	125	126	127	129	129	84	84	85	86	86	87	88
11	90th	114	114	116	117	118	119	120	74	74	74	75	76	77	77
	95th	118	118	119	121	122	123	124	78	78	78	79	80	81	81
	99th	125	125	126	128	129	130	131	85	85	86	87	87	88	89
12	90th	116	116	117	119	120	121	122	75	75	75	76	77	78	78
	95th	119	120	121	123	124	125	126	79	79	79	80	81	82	82
	99th	127	127	128	130	131	132	133	86	86	87	88	88	89	90
13	90th	117	118	119	121	122	123	124	76	76	76	77	78	79	79
	95th	121	122	123	124	126	127	128	80	80	80	81	82	83	83
	99th	128	129	130	132	133	134	135	87	87	88	89	89	90	91
14	90th	119	120	121	122	124	125	125	77	77	77	78	79	80	80
	95th	123	123	125	126	127	129	129	81	81	81	82	83	84	84
	99th	130	131	132	133	135	136	136	88	88	89	90	90	91	92
15	90th	120	121	122	123	125	126	127	78	78	78	79	80	81	81
	95th	124	125	126	127	129	130	131	82	82	82	83	84	85	85
	99th	131	132	133	134	136	137	138	89	89	90	91	91	92	93
16	90th	121	122	123	124	126	127	128	78	78	79	80	81	81	82
	95th	125	126	127	128	130	131	132	82	82	83	84	85	85	86
	99th	132	133	134	135	137	138	139	90	90	90	91	92	93	93
17	90th	122	122	123	125	126	127	128	78	79	79	80	81	81	82
	95th	125	126	127	129	130	131	132	82	83	83	84	85	85	86
	99th	133	133	134	136	137	138	139	90	90	91	91	92	93	93

Modified from Task Force on High Blood Pressure in Children and Adolescents [7]. Boxed area corresponds to reference values of boys 16 years or older in which the reference values for adults are recommended. BP, blood pressure.

# Çocuklar ve Adolesanlarda Hipertansiyon Tanımı



- 16 yaş  $\leq$  kız ve erkek adolesanlar için HTN tanımında erişkinlerde kullanılan sınırlar kullanılır
- Yüksek-Normal KB (130/85–139/89 mmHg)
- HTN (140/90 mmHg)

2016 European Society of Hypertension (ESH) guidelines for the management of high blood pressure in children and adolescents. *J Hypertens* 34:1887-1920,2016

\*Flynn JT et al. *Pediatrics* 2017;140(3):e20171904 (AAP 2017 Guidelines)  
ESH 2016 değerlendirmesindeki 16 yaş  $\leq$  'ni 13 yaş  $\leq$  için uyguluyor. Bu kavram henüz uygulamaya geçmedi



**TABLE 3** Updated Definitions of BP Categories and Stages

For Children Aged 1–13 y	For Children Aged $\geq 13$ y
Normal BP: <90th percentile	Normal BP: <120/<80 mm Hg
Elevated BP: $\geq 90$ th percentile to <95th percentile or 120/80 mm Hg to <95th percentile (whichever is lower)	Elevated BP: 120/<80 to 129/<80 mm Hg
Stage 1 HTN: $\geq 95$ th percentile to <95th percentile + 12 mmHg, or 130/80 to 139/89 mm Hg (whichever is lower)	Stage 1 HTN: 130/80 to 139/89 mm Hg
Stage 2 HTN: $\geq 95$ th percentile + 12 mm Hg, or $\geq 140/90$ mm Hg (whichever is lower)	Stage 2 HTN: $\geq 140/90$ mm Hg

**Flynn JT et al. Pediatrics 2017;140(3):e20171904 (AAP 2017 Guidelines)**



# OLGU:1



- 15 yaş erkek atlet, şiddetli baş ağrısı nedeniyle başvurdu. Koşarken aralıklı göğüs ağrısı olmuş. 3 yıl önce bir kez KB ölçülmüş. Daha sonra kontrol yapılmamış
- Öz geçmişi: Özellik yok
- Soy geçmişi: Babası, halası ve dedesi HT hastası
- Ağ: 173 cm (%75)
- Boy: 65 kg (%75)
- VKI: 21.7 (%75-85)
- TA: **160/95 mmHg** (3 ayrı ölçümün ort.)  
(> 99.per.+5mmHg) EVRE II HT  
(>140/90 mmHg Evre II AAP 2017)

# 1-18 yaş arası erkek çocuklar için boy ve yaşa göre KB percentilleri

TABLE 4 BP Levels for Boys by Age and Height Percentile

Age (y)	BP Percentile	SBP (mm Hg)								DBP (mm Hg)					
		Height Percentile or Measured Height								Height Percentile or Measured Height					
		5%	10%	25%	50%	75%	90%	95%	5%	10%	25%	50%	75%	90%	95%
1	Height (in)	30.4	30.8	31.6	32.4	33.3	34.1	34.6	30.4	30.8	31.6	32.4	33.3	34.1	34.6
	Height (cm)	77.2	78.3	80.2	82.4	84.6	86.7	87.9	77.2	78.3	80.2	82.4	84.6	86.7	87.9
	50th	85	85	86	86	87	88	88	40	40	40	41	41	42	42
	90th	98	99	99	100	100	101	101	52	52	53	53	54	54	54
	95th	102	102	103	103	104	105	105	54	54	55	55	56	57	57
2	95th + 12 mm Hg	114	114	115	115	116	117	117	66	66	67	67	68	69	69
	Height (in)	33.9	34.4	35.3	36.3	37.3	38.2	38.8	33.9	34.4	35.3	36.3	37.3	38.2	38.8
	Height (cm)	86.1	87.4	89.6	92.1	94.7	97.1	98.5	86.1	87.4	89.6	92.1	94.7	97.1	98.5
	50th	87	87	88	89	89	90	91	43	43	44	44	45	46	46
	90th	100	100	101	102	103	103	104	55	55	56	56	57	58	58
3	95th	104	105	105	106	107	107	108	57	58	58	59	60	61	61
	95th + 12 mm Hg	116	117	117	118	119	119	120	69	70	70	71	72	73	73
	Height (in)	36.4	37	37.9	39	40.1	41.1	41.7	36.4	37	37.9	39	40.1	41.1	41.7
	Height (cm)	92.5	93.9	96.3	99	101.8	104.3	105.8	92.5	93.9	96.3	99	101.8	104.3	105.8
	50th	88	89	89	90	91	92	92	45	46	46	47	48	49	49
4	90th	101	102	102	103	104	105	105	58	58	59	59	60	61	61
	95th	106	106	107	107	108	109	109	60	61	61	62	63	64	64
	95th + 12 mm Hg	118	118	119	119	120	121	121	72	73	73	74	75	76	76
	Height (in)	38.8	39.4	40.5	41.7	42.9	43.9	44.5	38.8	39.4	40.5	41.7	42.9	43.9	44.5
	Height (cm)	98.5	100.2	102.9	105.9	108.9	111.5	113.2	98.5	100.2	102.9	105.9	108.9	111.5	113.2
5	50th	90	90	91	92	93	94	94	48	49	49	49	51	52	52
	90th	102	103	104	105	105	106	107	60	61	62	62	63	64	64
	95th	107	107	108	108	109	110	110	63	64	65	66	67	67	68
	95th + 12 mm Hg	119	119	120	120	121	122	122	75	76	77	78	79	79	80
	Height (in)	41.1	41.8	43.0	44.3	45.5	46.7	47.4	41.1	41.8	43.0	44.3	45.5	46.7	47.4
6	Height (cm)	104.4	106.2	109.1	112.4	115.7	118.6	120.3	104.4	106.2	109.1	112.4	115.7	118.6	120.3
	50th	91	92	93	94	95	96	96	51	51	52	53	54	55	55
	90th	103	104	105	106	107	108	108	63	64	65	65	66	67	67
	95th	107	108	109	109	110	111	112	66	67	68	69	70	70	71
	95th + 12 mm Hg	119	120	121	121	122	123	124	78	79	80	81	82	82	83
7	Height (in)	43.4	44.2	45.4	46.8	48.2	49.4	50.2	43.4	44.2	45.4	46.8	48.2	49.4	50.2
	Height (cm)	110.3	112.2	115.3	118.9	122.4	125.6	127.5	110.3	112.2	115.3	118.9	122.4	125.6	127.5
	50th	93	93	94	95	96	97	98	54	54	55	56	57	57	58
	90th	105	105	106	107	109	110	110	66	66	67	68	68	69	69
	95th	108	109	110	111	112	113	114	69	70	70	71	72	72	73
8	95th + 12 mm Hg	120	121	122	123	124	125	126	81	82	82	83	84	84	85
	Height (in)	45.7	46.5	47.8	49.3	50.8	52.1	52.9	45.7	46.5	47.8	49.3	50.8	52.1	52.9
	Height (cm)	116.1	118	121.4	125.1	128.9	132.4	134.5	116.1	118	121.4	125.1	128.9	132.4	134.5
	50th	94	94	95	97	98	99	99	56	56	57	58	58	59	59
	90th	106	107	108	109	110	111	111	68	68	69	70	70	71	71
9	95th	110	110	111	112	114	115	116	71	71	72	73	73	74	74
	95th + 12 mm Hg	122	122	123	124	126	127	128	83	83	84	85	85	86	86

Flynn JT et al. Pediatrics 2017;140(3):e20171904 (AAP Guidleines)

En son yayınlanan tablolar. Henüz uygulamada pratiğimiz yok...

**TABLE 4** Continued

Age (y)	BP Percentile	SBP (mm Hg)								DBP (mm Hg)					
		Height Percentile or Measured Height								Height Percentile or Measured Height					
		5%	10%	25%	50%	75%	90%	95%	5%	10%	25%	50%	75%	90%	95%
8	Height (in)	47.8	48.6	50	51.6	53.2	54.6	55.5	47.8	48.6	50	51.6	53.2	54.6	55.5
	Height (cm)	121.4	123.5	127	131	135.1	138.8	141	121.4	123.5	127	131	135.1	138.8	141
	50th	95	96	97	98	99	99	100	57	57	58	59	59	60	60
	90th	107	108	109	110	111	112	112	69	70	70	71	72	72	73
	95th	111	112	112	114	115	116	117	72	73	73	74	75	75	75
	95th + 12 mm Hg	123	124	124	126	127	128	129	84	85	85	86	87	87	87
9	Height (in)	49.6	50.5	52	53.7	55.4	56.9	57.9	49.6	50.5	52	53.7	55.4	56.9	57.9
	Height (cm)	126	128.3	132.1	136.3	140.7	144.7	147.1	126	128.3	132.1	136.3	140.7	144.7	147.1
	50th	96	97	98	99	100	101	101	57	58	59	60	61	62	62
	90th	107	108	109	110	112	113	114	70	71	72	73	74	74	74
	95th	112	112	113	115	116	118	119	74	74	75	76	76	77	77
	95th + 12 mm Hg	124	124	125	127	128	130	131	86	86	87	88	88	89	89
10	Height (in)	51.3	52.2	53.8	55.6	57.4	59.1	60.1	51.3	52.2	53.8	55.6	57.4	59.1	60.1
	Height (cm)	130.2	132.7	136.7	141.3	145.9	150.1	152.7	130.2	132.7	136.7	141.3	145.9	150.1	152.7
	50th	97	98	99	100	101	102	103	59	60	61	62	63	63	64
	90th	108	109	111	112	113	115	116	72	73	74	74	75	75	76
	95th	112	113	114	116	118	120	121	76	76	77	77	78	78	78
	95th + 12 mm Hg	124	125	126	128	130	132	133	88	88	89	89	90	90	90
11	Height (in)	53	54	55.7	57.6	59.6	61.3	62.4	53	54	55.7	57.6	59.6	61.3	62.4
	Height (cm)	134.7	137.3	141.5	146.4	151.3	155.8	158.6	134.7	137.3	141.5	146.4	151.3	155.8	158.6
	50th	99	99	101	102	103	104	106	61	61	62	63	63	63	63
	90th	110	111	112	114	116	117	118	74	74	75	75	75	76	76
	95th	114	114	116	118	120	123	124	77	78	78	78	78	78	78
	95th + 12 mm Hg	126	126	128	130	132	135	136	89	90	90	90	90	90	90
12	Height (in)	55.2	56.3	58.1	60.1	62.2	64	65.2	55.2	56.3	58.1	60.1	62.2	64	65.2
	Height (cm)	140.3	143	147.5	152.7	157.9	162.6	165.5	140.3	143	147.5	152.7	157.9	162.6	165.5
	50th	101	101	102	104	106	108	109	61	62	62	62	62	63	63
	90th	113	114	115	117	119	121	122	75	75	75	75	75	76	76
	95th	116	117	118	121	124	126	128	78	78	78	78	78	79	79
	95th + 12 mm Hg	128	129	130	133	136	138	140	90	90	90	90	90	91	91
13	Height (in)	57.9	59.1	61	63.1	65.2	67.1	68.3	57.9	59.1	61	63.1	65.2	67.1	68.3
	Height (cm)	147	150	154.9	160.3	165.7	170.5	173.4	147	150	154.9	160.3	165.7	170.5	173.4
	50th	103	104	105	108	110	111	112	61	60	61	62	63	64	65
	90th	115	116	118	121	124	126	126	74	74	74	75	76	77	77
	95th	119	120	122	125	128	130	131	78	78	78	78	80	81	81
	95th + 12 mm Hg	131	132	134	137	140	142	143	90	90	90	90	92	93	93
14	Height (in)	60.6	61.8	63.8	65.9	68.0	69.8	70.9	60.6	61.8	63.8	65.9	68.0	69.8	70.9
	Height (cm)	153.8	156.9	162	167.5	172.7	177.4	180.1	153.8	156.9	162	167.5	172.7	177.4	180.1
	50th	105	106	109	111	112	113	113	60	60	62	64	65	66	67
	90th	119	120	123	126	127	128	129	74	74	75	77	78	79	80
	95th	123	125	127	130	132	133	134	77	78	79	81	82	83	84
	95th + 12 mm Hg	135	137	139	142	144	145	146	89	90	91	93	94	95	96



**TABLE 4 Continued**

Age (y)	BP Percentile	SBP (mm Hg)								DBP (mm Hg)					
		Height Percentile or Measured Height								Height Percentile or Measured Height					
		5%	10%	25%	50%	75%	90%	95%	5%	10%	25%	50%	75%	90%	95%
15	Height (in)	62.6	63.8	65.7	67.8	69.8	71.5	72.5	62.6	63.8	65.7	67.8	69.8	71.5	72.5
	Height (cm)	159	162	166.9	172.2	177.2	181.6	184.2	159	162	166.9	172.2	177.2	181.6	184.2
	50th	108	110	112	113	114	114	114	61	62	64	65	66	67	68
	90th	123	124	126	128	129	130	130	75	76	78	79	80	81	81
	95th	127	129	131	132	134	135	135	78	79	81	83	84	85	85
	95th + 12 mm Hg	139	141	143	144	146	147	147	90	91	93	95	96	97	97
16	Height (in)	63.8	64.9	66.8	68.8	70.7	72.4	73.4	63.8	64.9	66.8	68.8	70.7	72.4	73.4
	Height (cm)	162.1	165	169.6	174.6	179.5	183.8	186.4	162.1	165	169.6	174.6	179.5	183.8	186.4
	50th	111	112	114	115	115	116	116	63	64	66	67	68	69	69
	90th	126	127	128	129	131	131	132	77	78	79	80	81	82	82
	95th	130	131	133	134	135	136	137	80	81	83	84	85	86	86
	95th + 12 mm Hg	142	143	145	146	147	148	149	92	93	95	96	97	98	98
17	Height (in)	64.5	65.5	67.3	69.2	71.1	72.8	73.8	64.5	65.5	67.3	69.2	71.1	72.8	73.8
	Height (cm)	163.8	166.5	170.9	175.8	180.7	184.9	187.5	163.8	166.5	170.9	175.8	180.7	184.9	187.5
	50th	114	115	116	117	117	118	118	65	66	67	68	69	70	70
	90th	128	129	130	131	132	133	134	78	79	80	81	82	82	83
	95th	132	133	134	135	137	138	138	81	82	84	85	86	86	87
	95th + 12 mm Hg	144	145	146	147	149	150	150	93	94	96	97	98	98	99

Use percentile values to stage BP readings according to the scheme in Table 3 (elevated BP:  $\geq 90$ th percentile; stage 1 HTN:  $\geq 95$ th percentile; and stage 2 HTN:  $\geq 95$ th percentile + 12 mm Hg). The 50th, 90th, and 95th percentiles were derived by using quantile regression on the basis of normal-weight children (BMI <85th percentile).<sup>77</sup>

# *Hipertansiyon Tanısı*



❧ Pediatrik yaş grubunda birinci basamak sağlık kuruluşlarında HTN tanısı konulduktan sonra hastanın izlem ve tedavisini yapacak ilgili bölüme sevk edilmesi gerekir

# Çocuklar ve Adolesanlarda Hipertansiyon İzlemi



≥ 3 yaş KB ölçümü yıllık yapılmalı

- ∞ Normotensif bulunanların 2 yılda bir KB kontrolü (2016 klavuzu)
- ∞ Yüksek -normal KB olan hastaların 1 yıl sonra değerlendirilmesi öneriliyor
- ∞ ≥ 3 yaş obezite, KB arttıran ilaç tedavisi, böbrek hastalığı, aort kuarktasyonu, DM varsa her kliniğe gelişte KB ölçümü (2017 Klavuzu)
- ∞ 3 yaş > özel durumlarda KB ölçülmesi

**Lurbe E. J Hypertens 34:1887-1920,2016 (ESH Guidelines)**

**Flynn JT et al. Pediatrics 2017:140(3):e20171904 (AAP Guidleines)**

# ABPM ( Ayaktan kan basıncı izlemi)



- ☞ Gündüz sistolik KB yükü %75
- ☞ Gündüz diyastolik KB yükü %60
- ☞ Gece sistolik KB yükü %60
- ☞ Gece diyastolik KB yükü %50





## **AHA Scientific Statement**

### **Update: Ambulatory Blood Pressure Monitoring in Children and Adolescents**

#### **A Scientific Statement From the American Heart Association**

Joseph T. Flynn, MD, MS, Chair; Stephen R. Daniels, MD, PhD, FAHA;  
Laura L. Hayman, PhD, MSN, FAHA; David M. Maahs, MD, PhD;  
Brian W. McCrindle, MD, MPH, FAHA; Mark Mitsnefes, MD, MS;  
Justin P. Zachariah, MD, MPH; Elaine M. Urbina, MD, MS, FAHA; on behalf of the  
American Heart Association Atherosclerosis, Hypertension and Obesity in Youth  
Committee of the Council on Cardiovascular Disease in the Young

***Hypertension*. 2014;63:1116-1135**



**Table A2. Normal Values for Ambulatory BP (mm Hg) for Healthy Girls by Height**

BP Percentile	Height, cm											
	120	125	130	135	140	145	150	155	160	165	170	175
<b>24-h SBP</b>												
50th	104.0	105.0	106.0	106.8	107.6	108.7	109.9	111.2	112.4	113.7	115.0	116.4
75th	108.2	109.3	110.3	111.2	112.1	113.2	114.6	115.9	117.0	118.0	119.2	120.4
90th	112.0	113.2	114.3	115.3	116.2	117.4	118.7	120.0	121.0	121.8	122.8	123.8
95th	114.3	115.6	116.7	117.7	118.7	119.9	121.2	122.5	123.3	124.1	124.9	125.8
99th	118.8	120.1	121.3	122.4	123.4	124.6	126.0	127.1	127.7	128.2	128.8	129.3
<b>Daytime SBP</b>												
50th	110.0	110.5	111.0	111.6	112.2	113.1	114.3	115.6	117.0	118.3	119.8	121.2
75th	114.4	115.0	115.7	116.3	117.0	118.1	119.4	120.7	121.9	123.1	124.2	125.3
90th	118.2	119.0	119.7	120.4	121.3	122.5	123.9	125.2	126.4	127.3	128.1	128.9
95th	120.4	121.3	122.1	122.9	123.8	125.1	126.5	127.9	129.1	129.8	130.5	131.0
99th	124.5	125.5	126.4	127.4	128.5	129.9	131.5	133.0	134.0	134.5	134.8	135.0
<b>Nighttime SBP</b>												
50th	95.0	95.7	96.4	96.9	97.5	98.1	98.9	100.0	101.1	102.2	103.4	104.6
75th	99.4	100.3	101.2	101.9	102.6	103.4	104.4	105.5	106.4	107.3	108.2	109.2
90th	103.3	104.4	105.5	106.5	107.5	108.5	109.5	110.5	111.2	111.8	112.4	113.1
95th	105.6	106.9	108.1	109.3	110.4	111.6	112.7	113.6	114.1	114.4	114.8	115.3
99th	109.8	111.5	113.1	114.7	116.2	117.7	118.9	119.5	119.6	119.4	119.3	119.4
<b>24-h DBP</b>												
50th	65.9	65.9	66.0	66.1	66.2	66.3	66.5	66.7	67.0	67.4	68.0	68.6
75th	68.6	68.9	69.2	69.5	69.8	70.1	70.4	70.6	70.7	71.0	71.3	71.6
90th	70.9	71.4	71.9	72.4	72.9	73.4	73.8	74.0	74.1	74.2	74.4	74.5
95th	72.2	72.8	73.4	74.1	74.7	75.3	75.7	76.0	76.1	76.2	76.2	76.2
99th	74.6	75.3	76.2	77.1	77.9	78.7	79.3	79.7	79.9	79.9	79.9	79.7
<b>Daytime DBP</b>												
50th	73.2	72.8	72.4	72.1	71.8	71.7	71.8	72.0	72.4	73.1	73.9	74.8
75th	76.9	76.6	76.4	76.2	76.1	76.1	76.1	76.2	76.4	76.8	77.3	77.8
90th	80.1	79.9	79.8	79.8	79.7	79.8	79.9	79.9	79.9	80.0	80.2	80.5
95th	81.9	81.8	81.8	81.8	81.9	82.0	82.0	82.0	82.0	81.9	82.0	82.0
99th	85.3	85.3	85.4	85.6	85.8	85.9	86.0	85.9	85.7	85.4	85.2	84.9
<b>Nighttime DBP</b>												
50th	55.4	55.3	55.1	54.8	54.6	54.4	54.3	54.4	54.6	54.9	55.1	55.4
75th	59.5	59.5	59.4	59.3	59.1	58.9	58.8	58.7	58.8	58.9	61.0	59.3
90th	63.1	63.3	63.4	63.4	63.3	63.1	63.0	62.9	62.9	62.9	66.9	63.1
95th	65.2	65.5	65.7	65.8	65.8	65.7	65.6	65.5	65.5	65.5	70.8	65.5
99th	69.1	69.6	70.1	70.4	70.6	70.8	70.8	70.7	70.7	70.6	79.0	70.4
<b>24-h MAP</b>												
50th	77.2	77.8	78.3	78.7	79.2	79.7	80.2	80.8	81.5	82.3	83.1	84.0
75th	80.6	81.2	81.8	82.4	82.9	83.5	84.1	84.7	85.3	85.9	86.6	87.4
90th	83.6	84.2	84.9	85.5	86.1	86.7	87.3	87.9	88.4	88.9	89.5	90.1
95th	85.3	86.0	86.7	87.4	88.0	88.6	89.2	89.7	90.2	90.6	91.1	91.7
99th	91.1	91.9	92.7	93.5	94.2	94.9	95.6	96.2	96.7	97.1	97.5	97.9

**Table A4. Normal Values for Ambulatory BP (mm Hg) for Healthy Girls by Age**

BP Percentile	Age, y											
	5	6	7	8	9	10	11	12	13	14	15	16
<b>24-h SBP</b>												
50th	102.8	104.1	105.3	106.5	107.6	108.7	109.7	110.7	111.8	112.8	113.8	114.8
75th	107.8	109.1	110.4	111.5	112.6	113.6	114.7	115.7	116.7	117.6	118.4	119.2
90th	112.3	113.7	115.0	116.1	117.2	118.2	119.2	120.2	121.2	121.9	122.6	123.2
95th	114.9	116.4	117.7	118.9	120.0	121.1	122.1	123.0	123.9	124.5	125.0	125.6
99th	119.9	121.5	123.0	124.3	125.5	126.5	127.5	128.4	129.0	129.5	129.7	130.0
<b>Daytime SBP</b>												
50th	108.4	109.5	110.6	111.5	112.4	113.3	114.2	115.3	116.4	117.5	118.6	119.6
75th	113.8	114.9	115.9	116.8	117.6	118.5	119.5	120.6	121.7	122.6	123.5	124.3
90th	118.3	119.5	120.6	121.5	122.4	123.3	124.3	125.3	126.4	127.2	127.9	128.5
95th	120.9	122.2	123.3	124.3	125.2	126.2	127.2	128.2	129.2	129.9	130.4	130.9
99th	125.6	127.1	128.4	129.6	130.6	131.7	132.7	133.7	134.5	135.0	135.2	135.4
<b>Nighttime SBP</b>												
50th	94.8	95.6	96.2	96.8	97.5	98.2	99.0	99.7	100.5	101.3	102.0	102.9
75th	100.2	101.1	101.8	102.5	103.2	104.0	104.7	105.2	105.8	106.3	106.8	107.3
90th	105.3	106.3	107.2	108.0	108.8	109.5	110.1	110.4	110.7	110.9	111.0	111.2
95th	108.4	109.6	110.6	111.5	112.3	113.0	113.5	113.6	113.7	113.6	113.5	113.5
99th	114.5	116.0	117.3	118.4	119.3	119.9	120.1	119.8	119.4	118.8	118.2	117.8
<b>24-h DBP</b>												
50th	65.5	65.6	65.8	65.9	66.0	66.2	66.4	66.6	67.0	67.2	67.5	67.7
75th	68.9	69.1	69.2	69.3	69.5	69.8	70.0	70.4	70.8	71.1	71.2	71.4
90th	72.1	72.2	72.3	72.4	72.6	72.9	73.2	73.7	74.1	74.4	74.6	74.7
95th	74.0	74.1	74.2	74.2	74.4	74.7	75.1	75.6	76.1	76.4	76.6	76.7
99th	77.6	77.6	77.6	77.6	77.7	78.0	78.4	79.1	79.7	80.1	80.4	80.5
<b>Daytime DBP</b>												
50th	72.6	72.6	72.4	72.2	72.0	71.8	71.8	72.1	72.4	72.8	73.2	73.5
75th	76.7	76.6	76.5	76.3	76.0	75.9	75.9	76.2	76.5	76.8	77.0	77.2
90th	80.2	80.2	80.0	79.8	79.5	79.3	79.4	79.6	80.0	80.2	80.3	80.3
95th	82.3	82.2	82.1	81.8	81.5	81.3	81.4	81.6	82.0	82.2	82.2	82.1
99th	86.1	86.0	85.8	85.5	85.2	85.0	85.0	85.3	85.6	85.7	85.6	85.4
<b>Nighttime DBP</b>												
50th	56.4	55.9	55.5	55.1	54.8	54.6	54.3	54.2	54.3	54.5	54.9	55.3
75th	61.1	60.6	60.1	59.7	59.4	59.2	58.9	58.7	58.7	58.7	58.8	59.1
90th	65.6	65.1	64.6	64.1	63.8	63.7	63.4	63.1	62.9	62.8	62.8	62.8
95th	68.5	67.9	67.4	66.9	66.6	66.5	66.2	65.9	65.6	65.4	65.3	65.2
99th	74.2	73.6	72.9	72.4	72.2	72.0	71.8	71.4	71.1	70.7	70.3	70.0
<b>24-h MAP</b>												
50th	77.5	78.0	78.4	78.8	79.2	79.6	80.2	80.9	81.5	82.2	82.7	83.0
75th	81.2	81.7	82.1	82.5	82.9	83.3	84.0	84.7	85.4	86.0	86.5	86.8
90th	84.6	85.0	85.4	85.7	86.1	86.5	87.1	87.9	88.6	89.2	89.7	89.9
95th	86.6	87.0	87.3	87.6	87.9	88.3	88.9	89.7	90.5	91.0	91.5	91.7
99th	90.5	90.8	90.9	91.0	91.2	91.6	92.2	93.0	93.7	94.2	94.6	94.8
<b>Daytime MAP</b>												
50th	83.7	83.9	84.0	84.1	84.2	84.4	84.7	85.2	85.9	86.5	87.1	87.7
75th	88.2	88.3	88.4	88.4	88.4	88.5	88.9	89.4	90.1	90.8	91.4	91.9
90th	92.2	92.2	92.2	92.1	92.0	92.1	92.4	93.0	93.6	94.3	94.8	95.4
95th	94.6	94.5	94.4	94.2	94.1	94.2	94.4	95.0	95.6	96.2	96.8	97.3
99th	99.0	98.7	98.5	98.2	97.9	97.9	98.1	98.6	99.2	99.7	100.2	100.7
<b>Nighttime MAP</b>												
50th	68.7	68.8	68.8	68.8	68.9	69.1	69.3	69.6	70.1	70.6	71.2	71.8
75th	73.0	73.1	73.1	73.2	73.4	73.6	73.8	74.1	74.5	74.9	75.4	75.9
90th	76.9	77.0	77.1	77.2	77.4	77.6	77.8	78.0	78.3	78.6	78.9	79.3
95th	79.2	79.4	79.6	79.7	79.8	80.1	80.2	80.3	80.5	80.7	80.9	81.2
99th	83.8	84.1	84.2	84.3	84.5	84.6	84.7	84.6	84.6	84.6	84.6	84.7

BP indicates blood pressure; DBP, diastolic blood pressure; MAP, mean arterial pressure; and SBP, systolic blood pressure.

# ABPM ( Ayaktan kan basıncı izlemi)



- ☞ Gündüz sistolik KB yükü %75
- ☞ Gündüz diyastolik KB yükü %60
- ☞ Gece sistolik KB yükü %60
- ☞ Gece diyastolik KB yükü %50



Classification	Office BP*	Mean Ambulatory SBP or DBP†‡	SBP or DBP Load, %†§
Normal BP	<90th %tile	<95th %tile	<25
White coat hypertension	≥95th %tile	<95th %tile	<25
Prehypertension	≥90th %tile or >120/80 mm Hg	<95th %tile	≥25
Masked hypertension	<95th %tile	>95th %tile	≥25
Ambulatory hypertension	>95th %tile	>95th %tile	25-50
Severe ambulatory hypertension (at risk for end-organ damage)	>95th %tile	>95th %tile	>50



# OLGU-1 devam



- œ BFT: N Kan şekeri:N ürik asit:8 mg/dl
- œ İdrar analizi:N pro (-) İK:BÜ
- œ GFH:100 ml/dk / 1.73 m<sup>2</sup>
- œ EKO : LVMI > 51g / boy<sup>2.7</sup>
- œ Oftalmolojik inceleme: I. derece HTRP

# Hedef Organ Hasarı

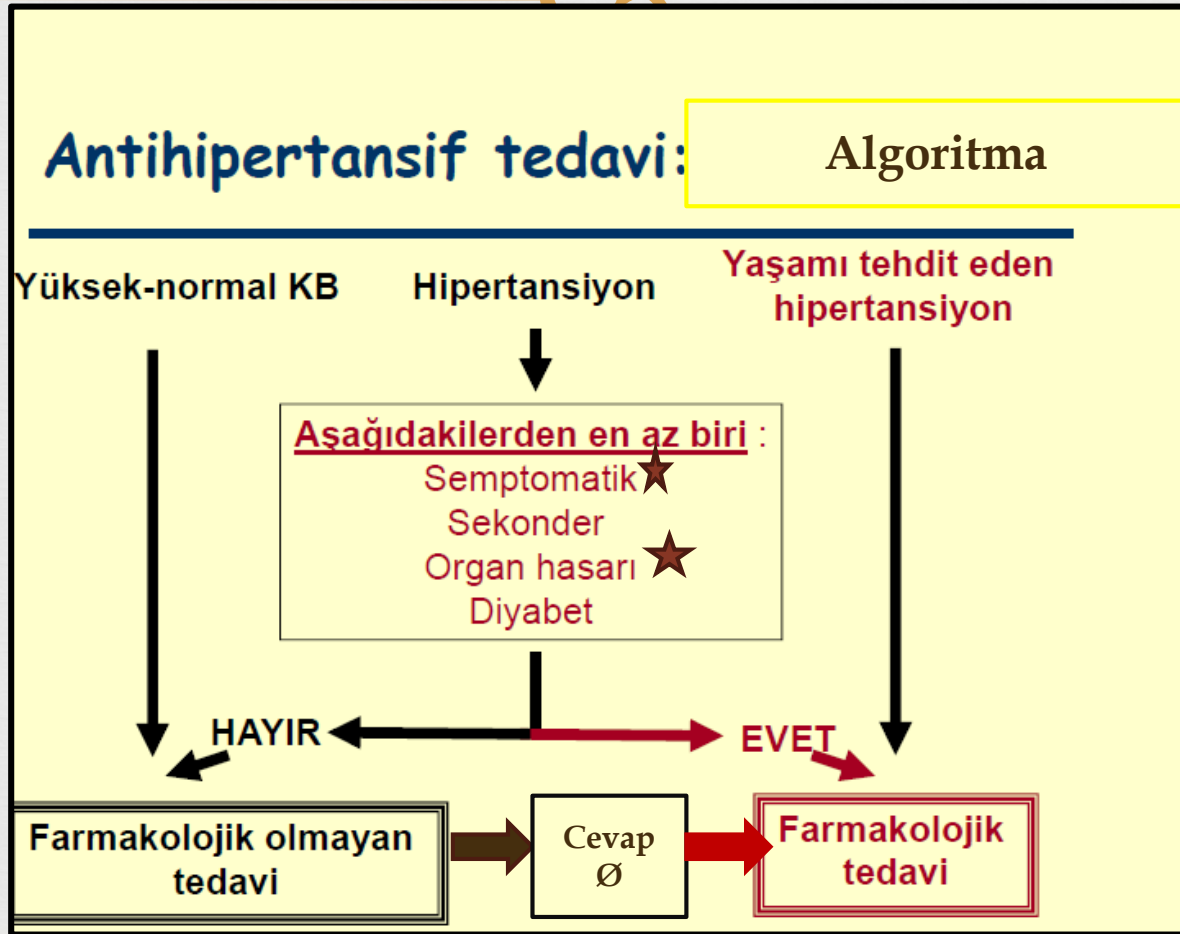


- ❧ Kalp\*\*
- ❧ Böbrekler
- ❧ SSS
- ❧ Damarlar
- ❧ Göz damarları\*\*

HTN'un bu organlar üzerinde erken evrede yaptığı yapısal ve fonksiyonel değişiklikler ancak uygun tanısal yöntemlerle saptanabilir

.

# HİPERTANSİYON TEDAVİSİ



# HİPERTANSİYON TEDAVİSİ

“Farmakolojik Olmayan Yaşam Tarzı Deęişiklikleri”

**Genel önlemler**

**Kilo kontrolü**

**Diyet ayarlaması**

**Egzersiz yapılması**

# GENEL ÖNLEMLER

☞ Fiziksel aktivite , diyet gibi önlemlerin bireysel ve ailecek yapılması

☞ Ebeveyn/aile fertlerinin de yaşam tarzına uyması

☞ Aile fertlerinin sigara içmesinin önlenmesi

☞ Hastanın sigara içmesinin önlenmesi

☞ Gerçekçi hedefler saptanması

☞ Ödül sistemi konulması

Oral kontraseptifler, NSAID, steroid, amfetamin, sempatomimetikler, bronkodilatörler, soğuk algınlığı ilaçlarındaki pseudoephedrine ve phenylpropanolamin ağır metaller, kafein, trisiklik antidepresanlar alma öyküsü olanların kullandığı ilaçların kesilmesi

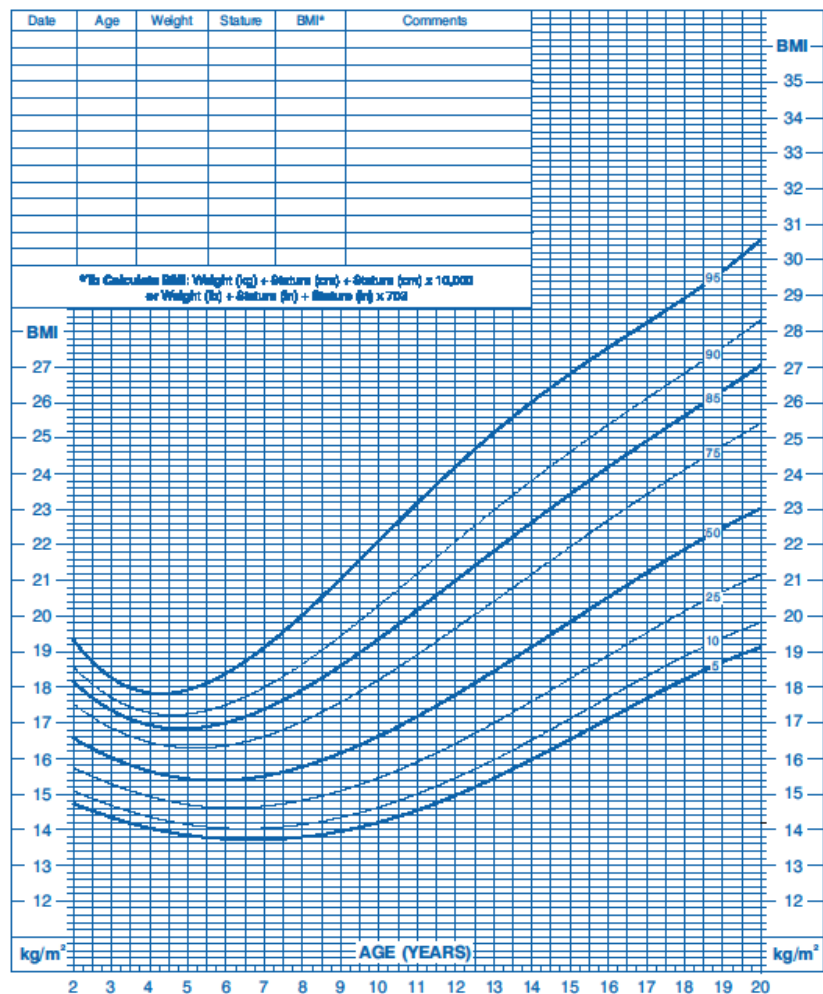
**Lurbe E. J Hypertens 34:1887-1920,2016**



### 2 to 20 years: Boys Body mass index-for-age percentiles

NAME \_\_\_\_\_

RECORD # \_\_\_\_\_



Published May 30, 2000 (modified 10/16/00).

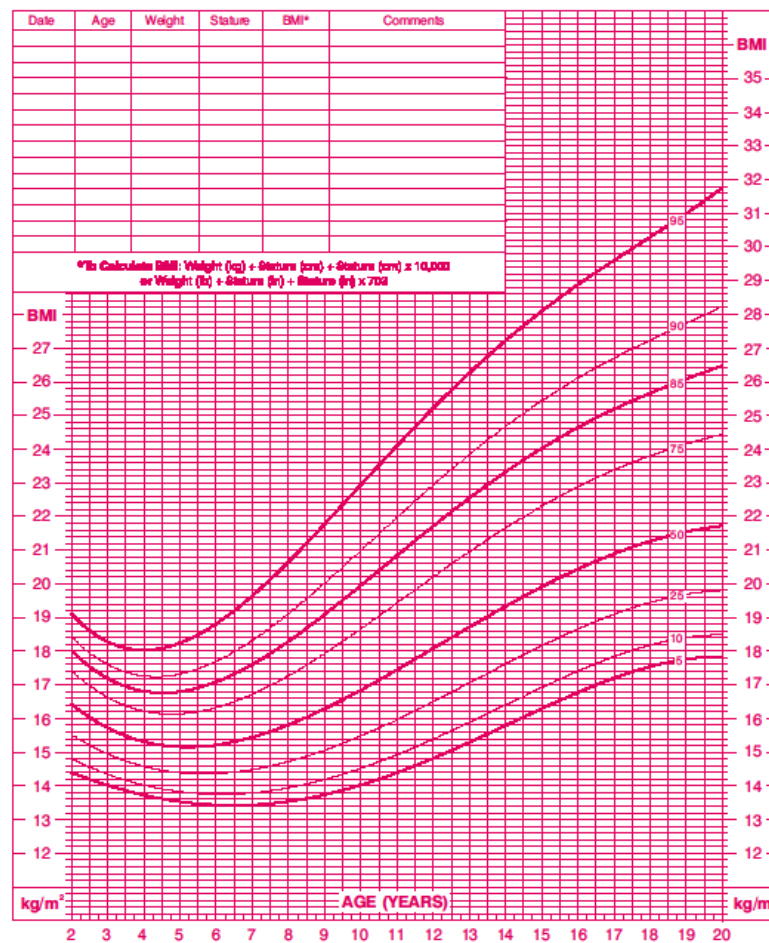
SOURCE: Developed by the National Center for Health Statistics in collaboration with the National Center for Chronic Disease Prevention and Health Promotion (2000). <http://www.cdc.gov/growthcharts>



### 2 to 20 years: Girls Body mass index-for-age percentiles

NAME \_\_\_\_\_

RECORD # \_\_\_\_\_



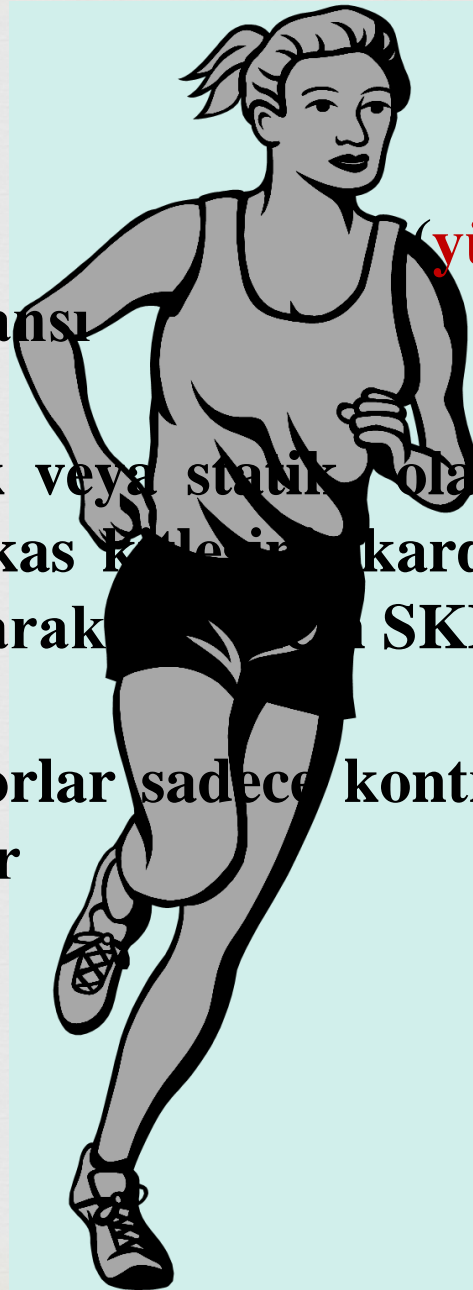
Published May 30, 2000 (modified 10/16/00).

SOURCE: Developed by the National Center for Health Statistics in collaboration with the National Center for Chronic Disease Prevention and Health Promotion (2000). <http://www.cdc.gov/growthcharts>



# OBESİTE

VKI persentilleri	
%< 5	DÜŞÜK KİLOLU
%5 %- 84	NORMAL KİLOLU
%85 %- 95	FAZLA KİLOLU
% ≥ 95	OBESE



**Aerobik egzersizler periferik vasküler rezistansı (yürüme, koşma, yüzme gibi) azaltarak KB'ni düşürür**

✓ **Anaerobik (izometrik veya statik olarak da bilinir) egzersizler (ağırlık kaldırma gibi) kas kütlesini kardiyak outputu ve periferik vasküler rezistansı artırarak SKB hem de DKB'ni artırır**

✓ **Rekabete dayanan sporlar sadece kontrol edilemeyen Evre 2 HT varsa sınırlandırılmalıdır**

# DİYET



☞ Günde 1< süt ve süt ürünleri  
2< meyva-sebze

HT riskini %35 azaltıyor

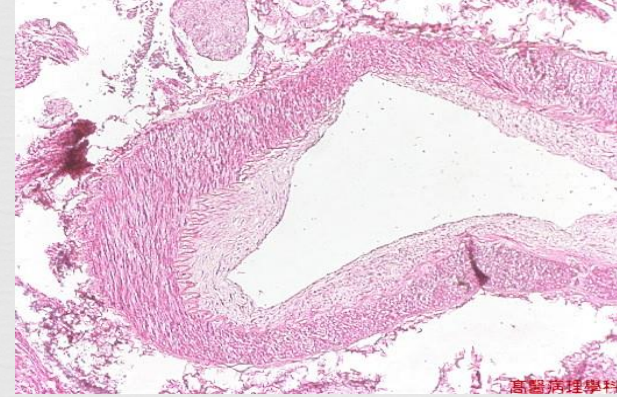
☞ Satüre yağ tüketiminin ↑

☞ Şekerli besin tüketiminin ↓

☞ Tuz tüketiminin süt çocukluğundan itibaren azaltılması ciddi oranda HT' u azaltıyor

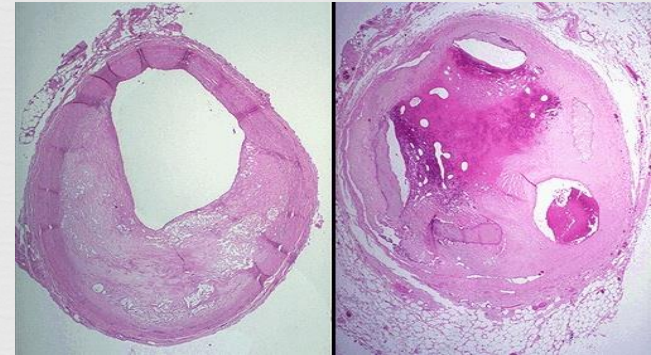
☞ Meşrubatlar, sunı tatlandırıcı kullanılan ürünlerden kaçınılması(ürük asit ↑)

# Primer hipertansiyon / ürik asit



☞ Fruktoz / NO↓ / Oksidatif stres↑ / glukoz intoleransı  
ürik asit ↑ / HT

Mısır şurubundan elde edilen früktoz içeren ürünlere  
DİKKAT !!!!



Dawson ve ark. 2006

Feig ve ark. 2008



**Semptomatik HT**

**Hedef organ hasarı var**

**Evre II HT**



**Genel önlemler (Kilo kontrolü \*\*)**

**+**

**İlaç tedavisi**

**+**

**Rekabete dayalı spor aktivitelerine  
ara vermesi gerek!!!**

# Hangi İlaç İle Tedaviye Başlayalım?



❧ Başlangıç tedavisi için

**Thiazide / ACEİ / ARB / KKB /  $\beta$  blokör**

❧ Seçilen ilacın çocuklar için onayı olmalı

❧ Günde tek doz tercih edilmeli → hasta uyumu açısından

❧ Okul saatlerine rastlamamalı

❧ Hiçbir ilacın diğerine üstünlüğünü gösteren çocukluk çağına ait bir çalışma yok !!!!!

# Çocuk veya Genç Erişkinlerde Kullanılan Antihipertansif İlaçların Dozları

TABLE 19. Antihypertensive medications for use in children and young adults

Class of drug	Drug	Recommended starting dose (per day)	Maximal dose (per day)	Dosing interval
Diuretics	Amiloride	0.4–0.6 mg/kg	20 mg	Daily
	Chlortalidone	0.3 mg/kg	2 mg/kg up to 50 mg	Daily
	Furosemide	0.5–2 mg/kg	6 mg/kg	Daily–twice daily
	Hydrochlorothiazide	0.5–1 mg/kg	3 mg/kg/day	Daily
	Spirolactone	1 mg/kg	3.3 mg/kg up to 100 mg	Daily–twice daily
	Eplerenone	25 mg	100 mg	Daily–twice daily
Beta blockers	Triamterene	1–2 mg/kg	3–4 mg/kg up to 300 mg	Twice daily
	Atenolol	0.5–1 mg/kg	2 mg/kg up to 100 mg	Daily–twice daily
	Metoprolol	0.5–1 mg/kg	2 mg/kg	Daily–twice daily
Calcium channel blockers	Propranolol	1 mg/kg	4 mg/kg up to 640 mg	Twice–thrice daily
	Amlodipine	0.06–0.3 mg/kg	5–10 mg	Daily
	Felodipine	2.5 mg	10 mg	Daily
ACE inhibitors	Nifedipine (extended release form)	0.25–0.5 mg/kg	3 mg/kg up to 120 mg	Daily–twice daily
	Benazepril	0.2 mg/kg up to 10 mg	0.6 mg/kg up to 40 mg	Daily
	Captopril	0.3–0.5 mg/kg/dose	6 mg/kg	Twice–thrice daily
	Enalapril	0.08–0.6 mg/kg		Daily
	Fosinopril	0.1–0.6 mg/kg	40 mg	Daily
	Lisinopril	0.08–0.6 mg/kg	0.6 mg/kg up to 40 mg	Daily
ARBs	Ramipril	1.5–6 mg/		Daily
	Candesartan	0.16–0.5 mg/kg		Daily
	Irbesartan	75–150 mg	300 mg	Daily
	Losartan	0.7 mg/kg up to 50 mg	1.4 mg/kg up to 100 mg	Daily–twice daily
Alpha and beta blocker	Valsartan	0.4 mg/kg	40–80 mg	Daily
	Labetolol	1–3 mg/kg	10–12 mg/kg up to 1200 mg	Twice daily
Central alpha-agonist	Clonidine	0.2 mg/kg	2.4 mg	Twice daily
Peripheral alpha-blockers	Doxazosin	1 mg	4 mg	Daily
	Prazosin	0.05–0.1 mg/kg	0.5 mg/kg	Thrice daily
Vasodilators	Hydralazine	0.75 mg/kg	7.5 mg/kg up to 200 mg	Four times daily
	Minoxidil	0.2 mg/kg	50–100 mg/day	Daily–thrice daily

Lurbe E. J Hypertens 34:1887-1920,2016





# İlk basamak ilaç seçiminde HT nedeni ve hastanın yakınmaları dikkate alınır !!!!



HTN+ DM + mikroalbüminüri	→ ACEI / ARB	
HTN+KBH +/- proteinüri	→ ACEI / ARB	
HTN+ migren	→ $\beta$ blokör /KKB	
Kortikosteroid'e 'e bağlı HTN	→ Diüretik	
Obesite ilişkili HTN	→ ACEI / ARB	→ Tolere edilemezse KKB



# Hangi İlaçlardan ne zaman Kaçınalım?



- HTN+Asthma / DM →  $\beta$  blokör  $\emptyset$
- HTN adolesan gebelik olasılığı var → ACEİ/ ARB  $\emptyset$
- HTN +Yarışmacı atlet → Diüretik ve/veya  $\beta$  blokör  $\emptyset$
- ACEİ / ARB.....Kan kreatinin / K düzeyi bak !!

# Olgu:2



7 yaş erkek hasta ÇAP'e konvulsiyon geçirme nedeniyle getirildi.

3 gündür idrarını az yapıyor. Bir gündür çay rengi idrar yaptığını farketmişler, sabahları gözlerinde şişlik oluyormuş.

Nefes almasında zorluk, dudaklarında morarma farkedilmiş. 10 dk. önce generalize kasılmaları olmuş.

Öyküsünden sağlıklı olduğu 10 gün önce akut tonsilit geçirdiği öğrenildi.

# Olgu:2



FM: Boy: 121 cm (%50) Ağ:25 kg .Önceki Ağ: 23.5 kg (%50)  
KB:160/100 ( %99+5mmHg = 127 /89 mmHg< )  
Nabız: 120/dk Solunum: 30/dk  
Şuur kapalı, post-iktal dönemde. Ağrılı uyaranlara cevabı az  
Dudaklarında hafif siyanozu var  
Göz kapakları ödemli Göz dibi muayenesi normal  
Akciğer basallerinde krepitan ralleri var.  
Karaciğer 2 cm palpabl  
Pretibial ++ ve skrotal ödem var

# Labaratuvar Bulguları

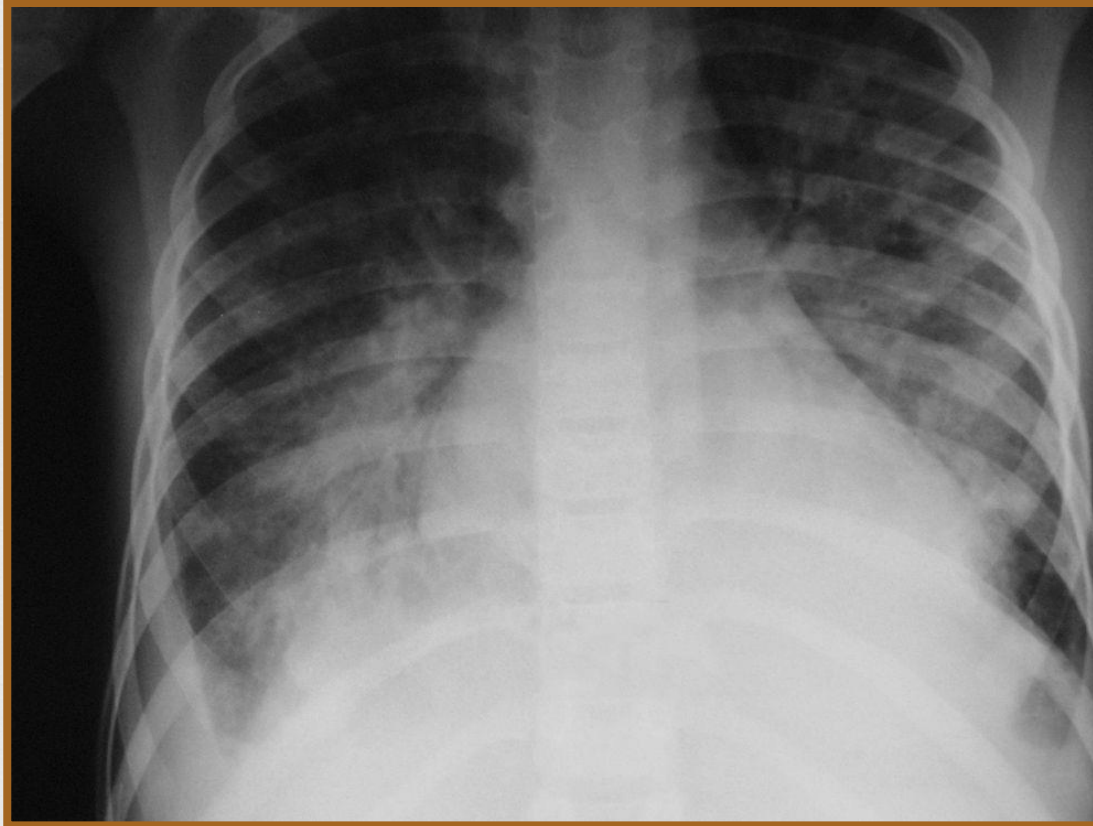


- ∞ Hb. 11 gr/dl BK:6500mm<sup>3</sup> trombosit: 200 000/mm<sup>3</sup>
- ∞ BUN: 45 mg/dl Kreatinin: 1.2 mgr/dl
- ∞ Na:128 mEq/L K:5.8 mEq/Lt Cl:100 mEq/L
- ∞ Ürik asit:7.5 mg/dl KCFT:Normal
- ∞ Kan gazı: 7.33 HCO<sub>3</sub>:17 mEq/L BE:-7
- ∞ **C3: 20 mg/dl** C4:20 mg/dl
- ∞ İdrar analizi: D:1020,pH:5 çay rengi ,kan reak:++++  
Prot:++

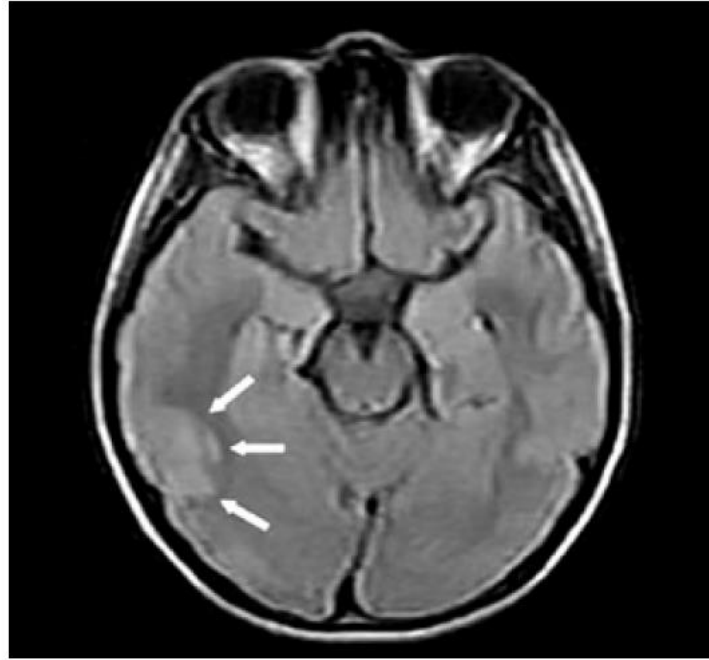
Mik:silme eritrosit, bol lökosit,eritrosit-lökosit silendirleri,  
ince ve kaba granüle silendirler

- ∞ EKG:Normal

# Akciğer Grafisi



# MRG



Temporookspital lobda kortiko-subkortikal yerleşimli,sulkuslarda hafif silinmeye neden olan hiperintens lezyon (beyaz oklar)  
PRES ile uyumlu

# OLGU-2 devam



- YBÜ de izleme alındı,monitörize edildi
- İdrara çıkımı izlemi için sonda takıldı
- Sodium Nitroprusside 0.6 µgr/kg/dk i.v
- 3 mg/kg Furosemide 1 st infüzyon
- 0.1 mg/kg Midazolam
- 20 mg/kg fenitoin yüklemesi
- Hemodiyaliz ünitesi ile temasa geçildi, santral kateter takıldı
- KB yakın izlem





- KB düşmeye başladı
- Şuuru açıldı
- Kr ve K üst sınırdan olduğundan ACEI/ARB verilmedi



7 yaş erkek çocuk 90 per: 109/72

KB:160/110 ( %99+5mmHg 127 /89 mmHg< )

6 st sonra hastanın KB 140/93mmHg

➤Sodium Nitropurissid infüzyonu 0.5 µgr/kg/dk ↓ i.v devam edildi

➤oral Amlodipin (KKB) 5 mg (0.2 mg/kg) (KKB) başlandı

➤2 mg/kg Furosemide infüzyon şeklinde tekrarlandı

İdrar çıkışı giderek arttı 5ml/kg/st'e kadar çıktı

Solunumu rahatladı, siyanozu geçti



24.St de KB: 120/80 mmHg

i.v tedavi kesildi.

HD gereksinimi kalmadı

Oral lasix +Amlodipin + tuzsuz diyet ile tedaviye devam edildi.

48.St de KB:110/70 mmHg

ASO:2500 IU .....1.2 Benzatin penisilin i.m yapıldı

# Hipertansif Aciller

## Ciddi hipertansiyon:

Genellikle altta yatan bir nedene baęlı olarak gelişir.  
Evre 2 HT sınırının  $>20$

❖ Hipertansif "urgency" (Aciliyet) : Ciddi hipertansiyon var ancak akut hedef organ hasarı yok

❖ Hipertansif "emergency" (Acillik) : Ciddi HT var, KVS, böbrekler ve SSS fonksiyonlarını tehdit eden bir durumdur

Fundoskopik inceleme ve nörolojik bulguların BT/MRI ile aydınlatılması gerekir

Daha önce HT tanısı almamış hastalar yanısıra kronik hipertansiyonu olanlarda da gelişebilir.

The Fourth Report on the Diagnosis, Evaluation and Treatment of High Blood Pressure in Children and Adolescents. Pediatrics. 2004; 114 (2) : 555-576.

Lurbe E. J Hypertens 34:1887-1920,2016

# Hipertansif Acil Durumun (Emergency) Tedavisi

- ❧ YBÜ de tedavi edilmelidir
- ❧ Hedef organ hasarını engellemek için kısa sürede düşürülmelidir
- ❧ İlk 6-8 st de hedeflenen düşüşün %25< düşürülmemelidir
- ❧ Geri kalan KB düşmesi 24-48 st içinde yapılmalıdır
- ❧ Hipertansif acil durum mutlaka I.V yolla tedavi edilmelidir
- ❧ Devamlı infüzyon bolus tedaviye tercih edilmelidir  
( ani hipotansiyon,vital organ hipoperfüzyonuna karşı)
- ❧ **Sodium nitroprusside** ve **labetalol** en çok tercih edilen ilaçlardır
- ❧ Hipertansif «urgency»aciliyet durumunda oral tedavi yapılabilir

# Hipertansif Acil Durumlarda İlaç tedavisi

★	Sodium nitroprusside	Direct vasodilator	Intravenous infusion	0.5–8 µg/kg per min	Within seconds	May cause thiocyanate toxicity, inactivated by light
	Nitroglycerine	Direct vasodilator	Intravenous infusion	0.1–2 µg/kg per min	1–2 min	May cause methemoglobinemia, vasodilating effect primarily on the venous side – efficient in heart failure, limited efficacy in children
★	Labetalol	Alpha and beta blocker	Intravenous infusion	0.25–3 mg/kg per h	5–10 min	Contraindication in asthma, heart failure and may cause bradycardia
	Nicardipine	Calcium channel blocker	Intravenous infusion	1–3 µg/kg per min	Within minutes	Reflex tachycardia
	Clonidine	Central alpha-agonist	Intravenous bolus	2–6 µg/kg per dose	10 min	Dry mouth, sedation and rebound hypertension
★	Esmolol	Beta-blocker	Intravenous infusion	100–500 µg/kg per min	Within seconds	Contraindication in asthma, may cause bradycardia
	Enalaprilat	ACEI	Intravenous bolus	0.005–0.01 mg/kg per dose	15 min	Contraindication in suspected bilateral renal artery stenosis
★	Furosemide	Loop diuretic	Intravenous bolus	0.5–5 mg/kg per dose	Within minutes	Hypokalemia. Useful in volume hypertension
	Urapidil	Peripheral alpha blocker and central agonist of 5-HT <sub>1A</sub> receptors	Intravenous infusion	Initial dose: 0.5–4.0 mg/kg per h maintenance dose: 0.2–2.0 mg/kg per h	1–5 min	May cause sedation, palpitation and nausea
	Nifedipine	Calcium channel blocker	Orally	0.25 mg/kg per dose	20–30 min	May cause unpredictable hypotension, reflex tachycardia
	Isradipine	Calcium channel blocker (L-type)	Orally	0.05–0.1 mg/kg per dose	1 h	Higher doses may cause blood pressure drop of >25%
	Captopril	ACEI	Orally	0.1–0.2 mg/kg per dose	10–20 min	Contraindication in suspected bilateral renal artery stenosis
	Minoxidil	Direct vasodilator	Orally	0.1–0.2 mg/kg per dose	5–10 min	Fluid retention

# OLGU:3



- ❧ 4 yaş erkek hasta , belirgin bir yakınması yok. Ancak zaman zaman bacaklarının ağrıdığını, oyun oynarken yorulduğunu ifade ediyor.
- ❧ Bir yıl önce başvurdukları hekim büyüme ağrısı olabileceğini düşündüğü için bir başka sağlık kuruluşuna başvurmaya gerek görülmemiş. TA ölçülmemiş.
- ❧ ÜSYE nedeniyle başvurdukları aile hekimi AFN -/-olmasından şüphelenerek hastaneye referetmiş

# Fizik İnceleme



Hastanın Ağ: 15 kg (%25) Boy: 98 cm (%25)

☞ Genel durumu iyi,koopere

☞ Kan basıncı : **128/82 sağ kol** { > 99.per.+5 mmHg }

(KB 90. per 105/67

AFN: -/-

Periferik nabazanlar: popliteal, dorsalis pedis, tibial nabızlar -/-

☞ Aort odağında IV/VI sistolik üfürüm



# Fizik İnceleme



\*\*\*\*\*

Sağ kol	128/82 mmHg	Sol kol	114/80 mmHg
Sağ bacak	93/71 mmHg	Sol bacak	99/60 mmHg

KB 90. per 105/67 95.per.109/71 mmHg

Kol KB < bacak KB arasında 10-20 mmHg fark olabilir

**Flynn JT et al. Pediatrics 2017;140(3):e20171904 (AAP 2017 Guidelines)**

*Kliegman RM, Stanton BF, Schor NF, Behrman RE. eds Nelson The Textbook of Pediatrics (20th Ed) Elsevier. Philadelphia, 2016*

# OLGU:3

✧ EKG: Ventriküler hipertrofi yok. Sol atrial hipertrofi, sinüs ritmi

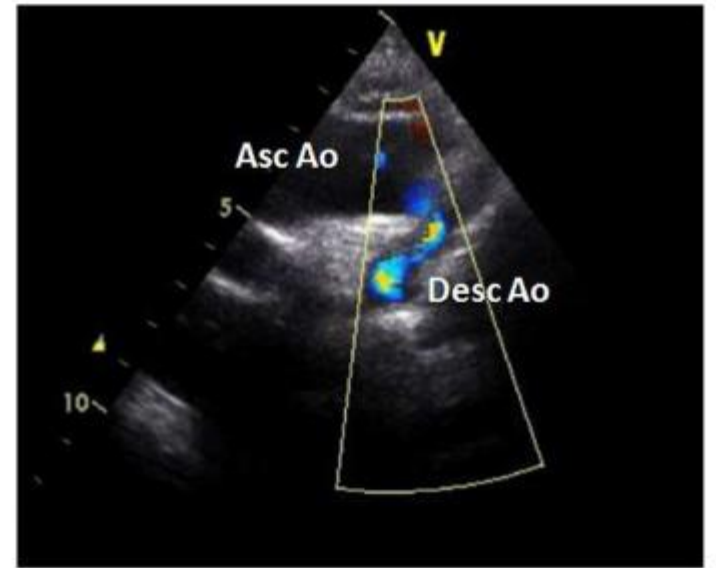
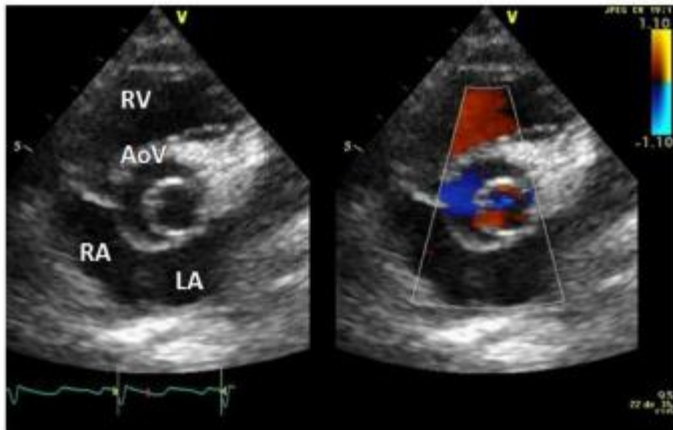
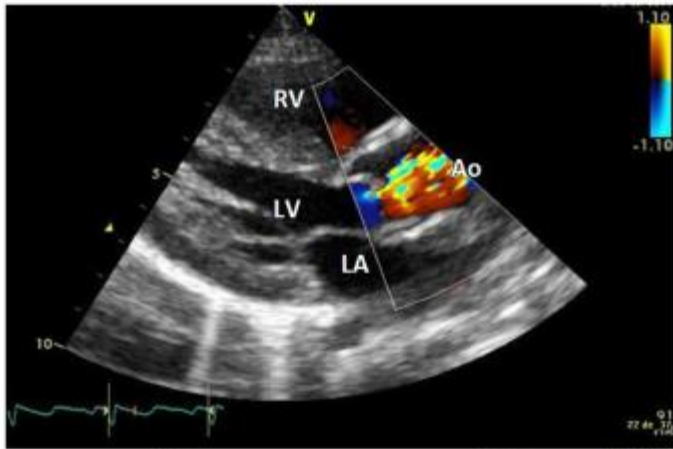


Solda aort kavsi yok. sağ mediastende inen aortanın dilatasyonuna bağlı görünüm, hafif kardiomegali

# OLGU:3

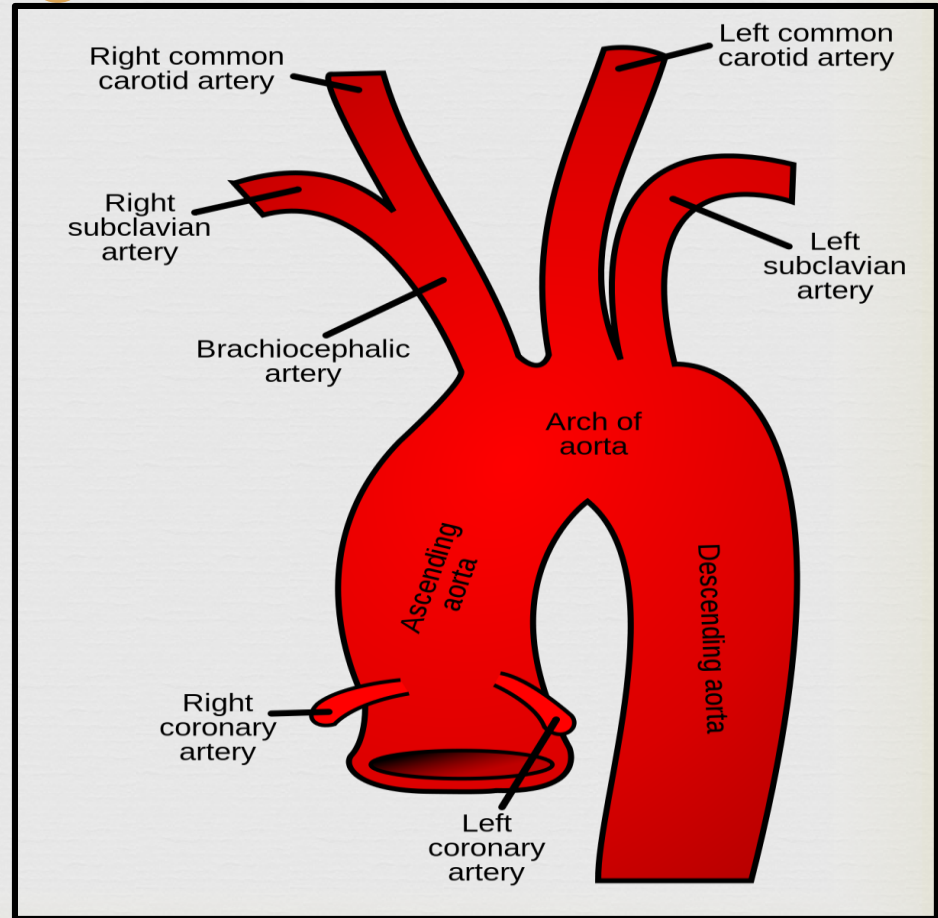
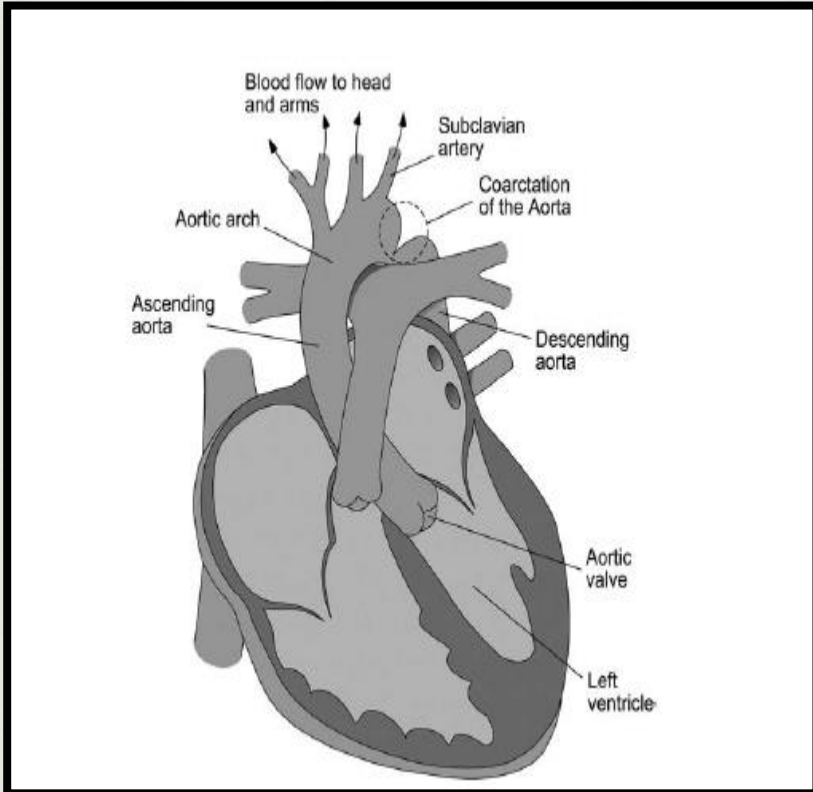
Sol SCA'in distalinde AoKo,  
bi-küspid aort valvi, ciddi stenoz  
Sistolik ve diyastolik fonksiyonu  
korunmuş SVH

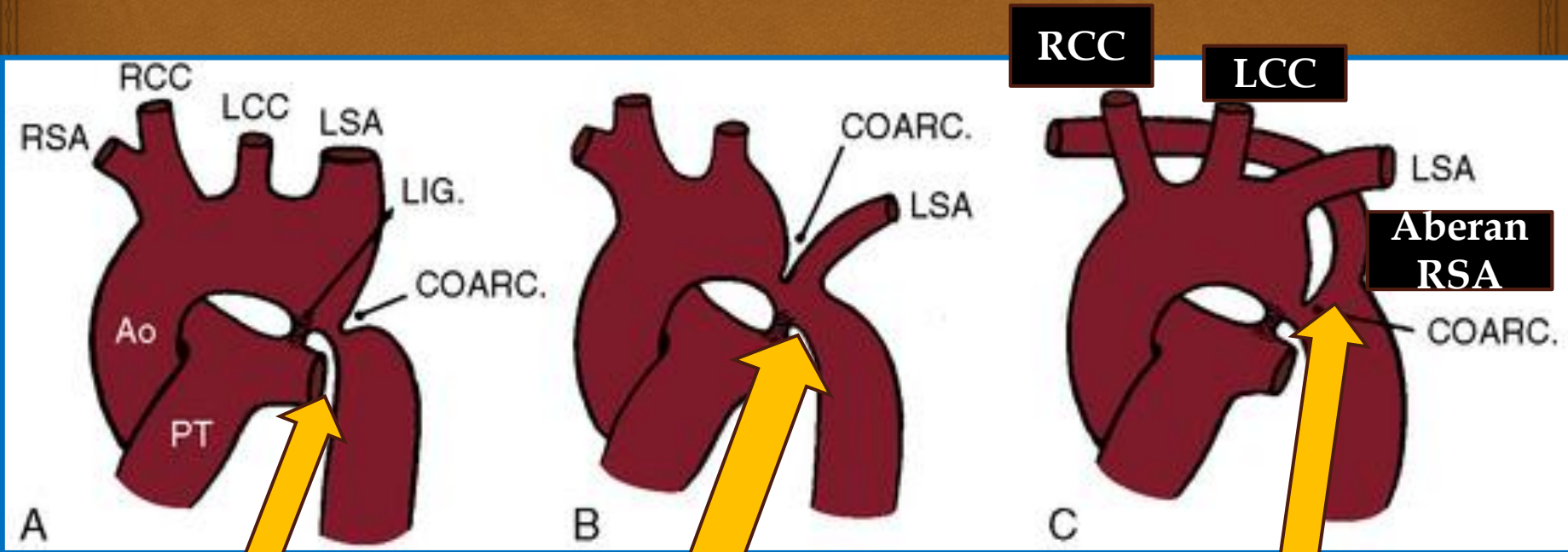
✂ E



# MR anjiografi







En sık görülen  
Aort  
koarktasyonu tipi  
KB ölçümü  
etkilenmez

Pre-duktal AoKo Sol subclavian  
AoKo bölgesinin distalinde ise  
**sağ kolda KB > sol Kol KB**

Aberan sağ subklavian arter varsa  
**sağ kolda KB < sol Kol KB**

**KB ölçümü her iki koldan da mutlaka yapılmalıdır**

# KB Hangi koldan ölçülmeli ?



**2016 Klavuzu sağ ve sol koldan ölç hangisi yüksekse onu kabul et ve oradan kontrol et !!!**





2017 AAP Klavuzu sađ koldan ölç (atipik aort kavsi yoksa örneđin: sađ aort kavsi ve aort kuarktasyonu, sol aort kavsi + aberan sađ subklavien arter)



YAŞ GRUBU	NEDEN
Yenidoğan	Renal arter / ven trombozu, renal arter stenozu, konjenital renal malformasyonlar, <b>aort koarktasyonu</b> , bronkopulmoner displazi, intra ventriküler kanama
1 ay-6 yaş	Renal parankimal hastalıklar, renal arter stenozu, <b>aort koarktasyonu</b> , ilaç tedavisi (steroid, albuterol pseudoefedrin), tümör (Willms), endokrin nedenler

**ÇOCUK VE ADÖLESANLARDA YAŞ GRUPLARINA GÖRE EN SIK RASTLANILAN HT NEDENLERİ**

YAŞ GRUBU	NEDEN
6-10 yaş	Renal parankimal hastalıklar, renovasküler hastalıklar, esansiyel hipertansiyon, endokrin nedenler
> 10 yaş	Esansiyel hipertansiyon, renal parankimal hastalıklar, madde bağımlılığı (kokain, amfetamin, kafein, phencylidine, methylphenidate)

**ÇOCUK VE ADÖLESANLARDA YAŞ GRUPLARINA GÖRE EN SIK RASTLANILAN HT NEDENLERİ**

# OLGU:3



œ Tedavi:

**Cerrahi**

œ Devam eden HT olursa

**$\beta$  Blokör / ACEİ / ARB /**

**Kombine tedavi gerekirse KKB eklenebilir**

# OLGU-4



- 38 yaşındaki annenin 3. gebeliğinden, ilki abortus olan gebelikten sonra yaşayan 2. çocuk olarak **28 haftalık** 1085 gr olarak doğmuş
- annenin BL RAS ve HT nedeniyle gebelik süresince **adalat ve alfamet** kullanmış,
- doğum öncesi iki gündür bebek hareketlerinin azalmış
- APGAR 1. dak 6, 5. dak. 8**
- Doğumun ilk saatinde RDS tanısıyla invaziv **surfaktan** tedavisi uygulandığı,

- Erken neonatal sepsis dışlanmadığından **ampisilin-amikasin**
- Umbilikal arteriyel ve umbilikal venöz kateter**
- Kafein** tedavisi başlanmış, dolaşım bozukluğu ve **hipotansiyon** nedeniyle 20 cc/kg dan iki kez serum fizyolojik
- dopamin-dobutamin ve milrinon** olmak üzere inotrop destek

# OLGU-4-devam



- Akciğer grafisinde belirgin **kardiyomegali**
- EKO:iskemik miyokard etkilenmesine bağlı **MY, TY**
- Hipoalbüminemi nedeniyle albümin desteği aldığı öğrenildi.
- Doğumun 6. saatinde genel durumu bozulup trombositopeni, **DİK, hipoglisemi, BY**

- oksijen ihtiyacında artış nedeniyle entübe edilip surfaktan verilerek **mekanik ventilatöre** bağlandığı,
- trombosit, kriyopresipitat ve plazma transfüzyonları yapıldığı öğrenildi.
- Hastanın genel durumu düzeliş kateterler çekilip, antibiyotikler kesildikten sonra postnatal 20. günde **SKB:98-110 mmHg. (>99.per)**

## Postmenstruel yaşa göre hayatın ikinci haftasından itibaren SKB ve DKB değerleri

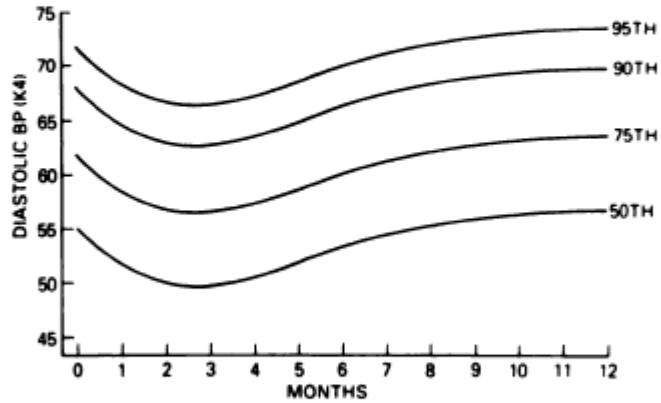
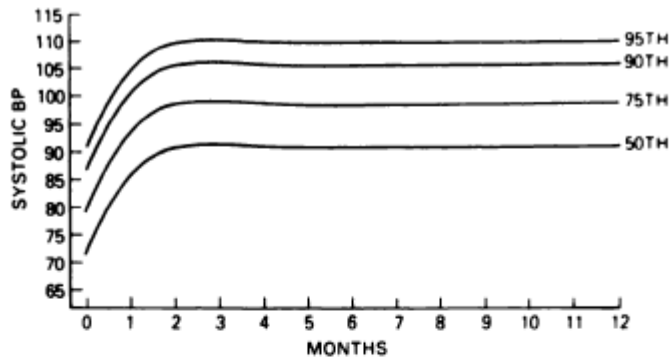
Postmenstrual age	Blood pressure	50th percentile	95th percentile	99th percentile
44 weeks	SBP	88	105	110
	MAP	63	80	85
	DBP	50	68	73
42 weeks	SBP	85	98	102
	MAP	62	76	81
	DBP	50	65	70
40 weeks	SBP	80	95	100
	MAP	60	75	80
	DBP	50	65	70
38 weeks	SBP	77	92	97
	MAP	59	74	79
	DBP	50	65	70
36 weeks	SBP	72	87	92
	MAP	57	72	77
	DBP	50	65	70
34 weeks	SBP	70	85	90
	MAP	50	65	70
	DBP	40	55	60
32 weeks	SBP	68	83	88
	MAP	49	64	69
	DBP	40	55	60
30 weeks	SBP	65	80	85
	MAP	48	63	68
	DBP	40	55	60
28 weeks	SBP	60	75	80
	MAP	45	58	63
	DBP	38	50	54
26 weeks	SBP	55	72	77
	MAP	38	57	63
	DBP	30	50	56

Modified from Dionne *et al.*<sup>17</sup>

DBP, diastolic blood pressure; MAP, mean arterial pressure; SBP, systolic blood pressure.

95 per. < HT  
99 per < Ciddi

Dionne JM, FlynnJT.  
Arch Dis Child  
2017:1-4



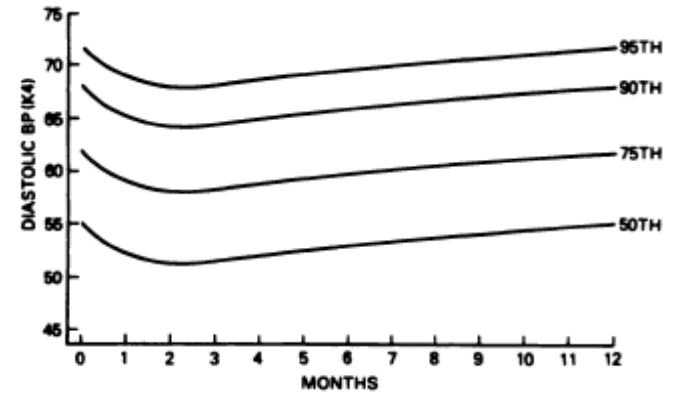
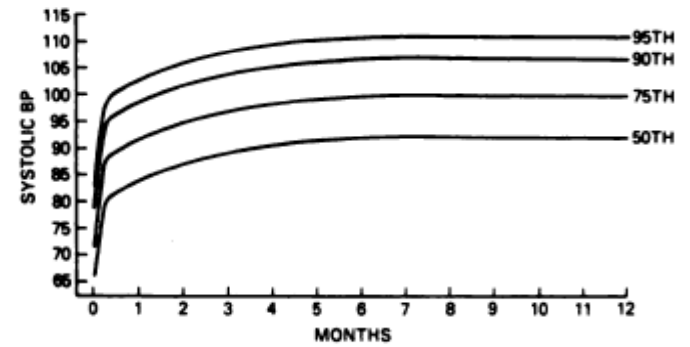
90TH PERCENTILE													
SYSTOLIC BP	87	101	106	106	106	105	105	105	105	105	105	105	105
DIASTOLIC BP	68	65	63	63	63	65	66	67	68	68	69	69	69
HEIGHT CM	51	59	63	66	68	70	72	73	74	76	77	78	80
WEIGHT KG	4	4	5	5	6	7	8	9	9	10	10	11	11

**Fig 1.** Age-specific percentiles of BP measurements in boys—birth to 12 months of age; Korotkoff phase IV (K4) used for diastolic BP.

## Erkek çocuklarda 0-12 ay KB değerleri

Report of the Second Task Force on Blood Pressure Control in Children--1987. Task Force on Blood Pressure Control in Children *Pediatrics*. 1987 Jan;79(1):1-25.

Flynn JT et al. *Pediatrics* 2017;140(3):e20171904 (AAP 2017 Guidelines) Güncel eğriler yayınlanmadığı için 1987’de yayınlanan bu eğrilerin kullanılmasını öneriyor



90TH PERCENTILE													
SYSTOLIC BP	76	88	101	104	105	106	106	106	106	106	106	105	105
DIASTOLIC BP	68	65	64	64	65	65	65	66	66	67	67	67	67
HEIGHT CM	54	55	56	58	61	63	65	66	68	70	72	74	75
WEIGHT KG	4	4	4	5	5	6	7	8	9	9	10	10	11

**Fig 2.** Age-specific percentiles of BP measurements in girls—birth to 12 months of age; Korotkoff phase IV (K4) used for diastolic BP.

## Kız çocuklarda 0-12 ay KB değerleri

# OLGU-4-devam



- AoKo yönünden ekstremitelerde ölçümlerinde gradient saptanmadı,
- EKO tekrar değ. AoKo yok
- Renal USG :N
- Renal Doppler: N
- Akciğer grafisi: N
- Cr. 1mg/dl 48.st

☞ Kafein dozu  
azaltılmasına rağmen  
hastada kan basıncı  
eğrilerine göre  
hipertansif değerler  
ölçüldü

☞ Amlodipin 0.06 mg/kg  
iki dozda oral başlandı.



# OLGU-4-devam



- ❧ EKO kardiyografi : N
- ❧ Doppler USG: N
- ❧ Renal USG : Normal
- ❧ Akciğer grafisi: N
- ❧ Cr. 1mg/dl 48.st

# YENİDOĞAN HİPERTANSİYONU



- ❧ YDYBÜ'de HT %1-2 oranında,
- ❧ Prematürelerde ve LBW bebeklerde daha sık.  
YDYBÜ'deki hipertansif bebeklerin %75'i prematüre
- ❧ Hipotansiyondan daha nadir
- ❧ Hipertansif hastalar kardiyojenik şok geliştirdiyse hipotansif olabilir. Tedavi sonrası KB↑

# YDYBÜ 'de HT gelişmesi için Risk faktörleri



- ✓ Böbrek parankimal hast.
- ✓ **Böbrek yetmezliği**
- ✓ **ECMO**
- ✓ İntraventrikuler hemoraji
- ✓ Konvülsiyon
- ✓ **Asfiksi**
- ✓ **Umblikal arter kateterizasyonu**

- ✓ Renovaskular hast.
- ✓ Neonatal abstinens sendromu
- ✓ **Maternal HT**
- ✓ **İlaçlar(Surfaktan,kafein)**
- ✓ Antenatal steroid
- ✓ PDA+İndomethacin
- ✓ Nekrotizan enterokolit

## Yenidoğanlarda Ciddi HT Tedavisi

Nicardipine	Calcium channel blocker	0.5–4 µg/kg/min	Infusion	Caution in perinatal asphyxia; prefer central line
Labetalol	Alpha and beta blocker	0.25–3 mg/kg/hour	Infusion	Caution in chronic lung disease, heart block, unstable heart failure and neurological injury
Esmolol	Beta blocker	50–1000 µg/kg/min	Infusion	Caution in chronic lung disease, heart block and unstable heart failure
Nitroprusside	Vasodilator	0.25–8 µg/kg/min	Infusion	Monitor for cyanide toxicity; caution in renal and hepatic failure
Short-acting intravenous medications				
Hydralazine	Vasodilator	0.2–1 mg/kg/dose	Q 4–6 hours	Rare agranulocytosis
Labetalol	Alpha and beta blocker	0.2–1 mg/kg/dose Maximum total 4 mg/kg	Q 10 min until effect	Caution in chronic lung disease, heart block and unstable heart failure
Short-acting oral medications				
Isradipine	★ Calcium channel blocker	0.05–0.15 mg/kg/dose	Q 6–8 hours	Caution with QTc prolongation
Nifedipine	Calcium channel blocker	0.1–0.25 mg/kg/dose	Q 4–6 hours	Caution with neurological injury
Clonidine	Central alpha agonist	0.5–2.5 µg/kg/dose	Q 6 hours	May cause somnolence, xerostomia, rebound hypertension

Dionne JM, Flynn JT.  
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TEŞEKKÜRLER

