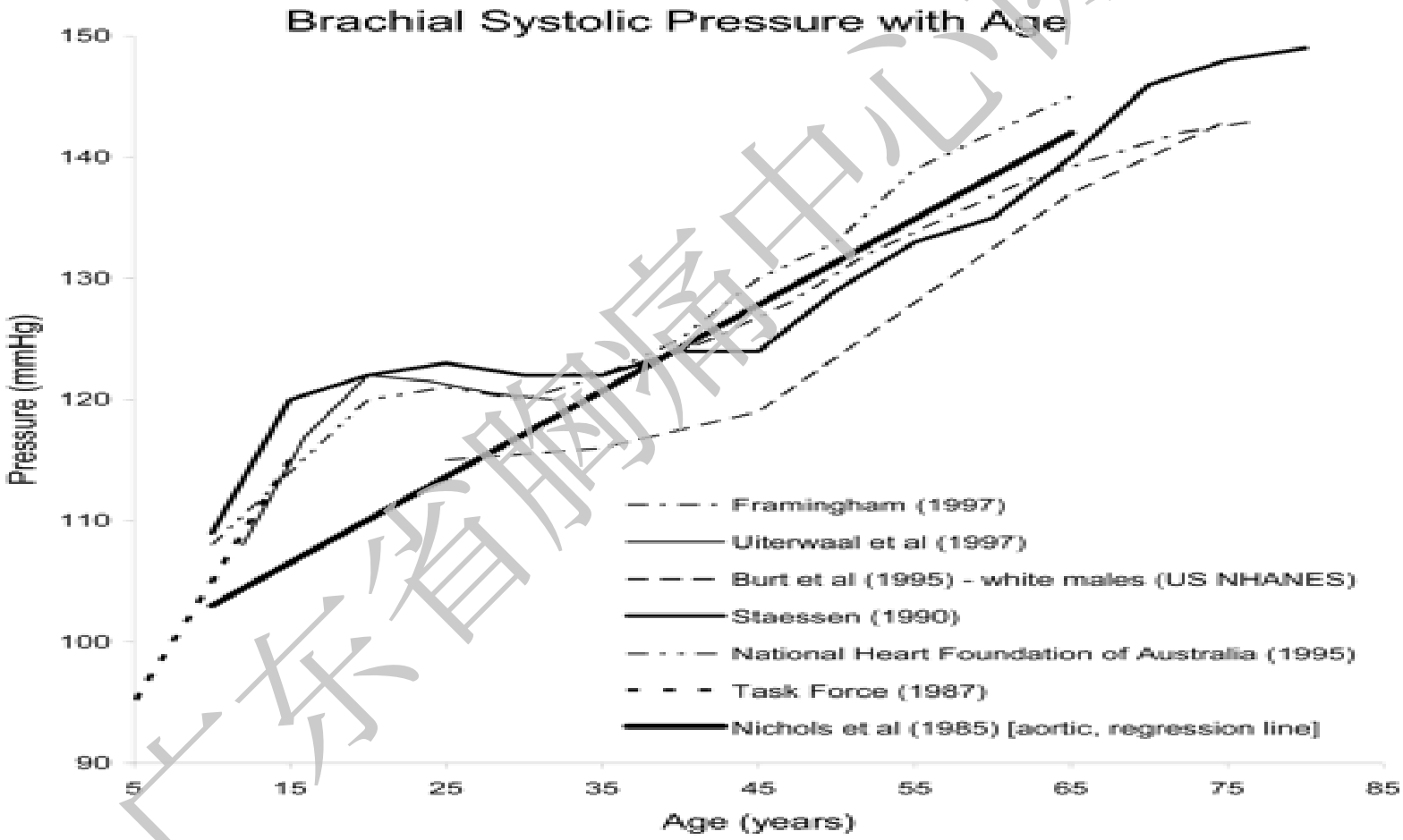
老年高血压患者的特点及其治疗对策

广东省人民医院

冯颖青

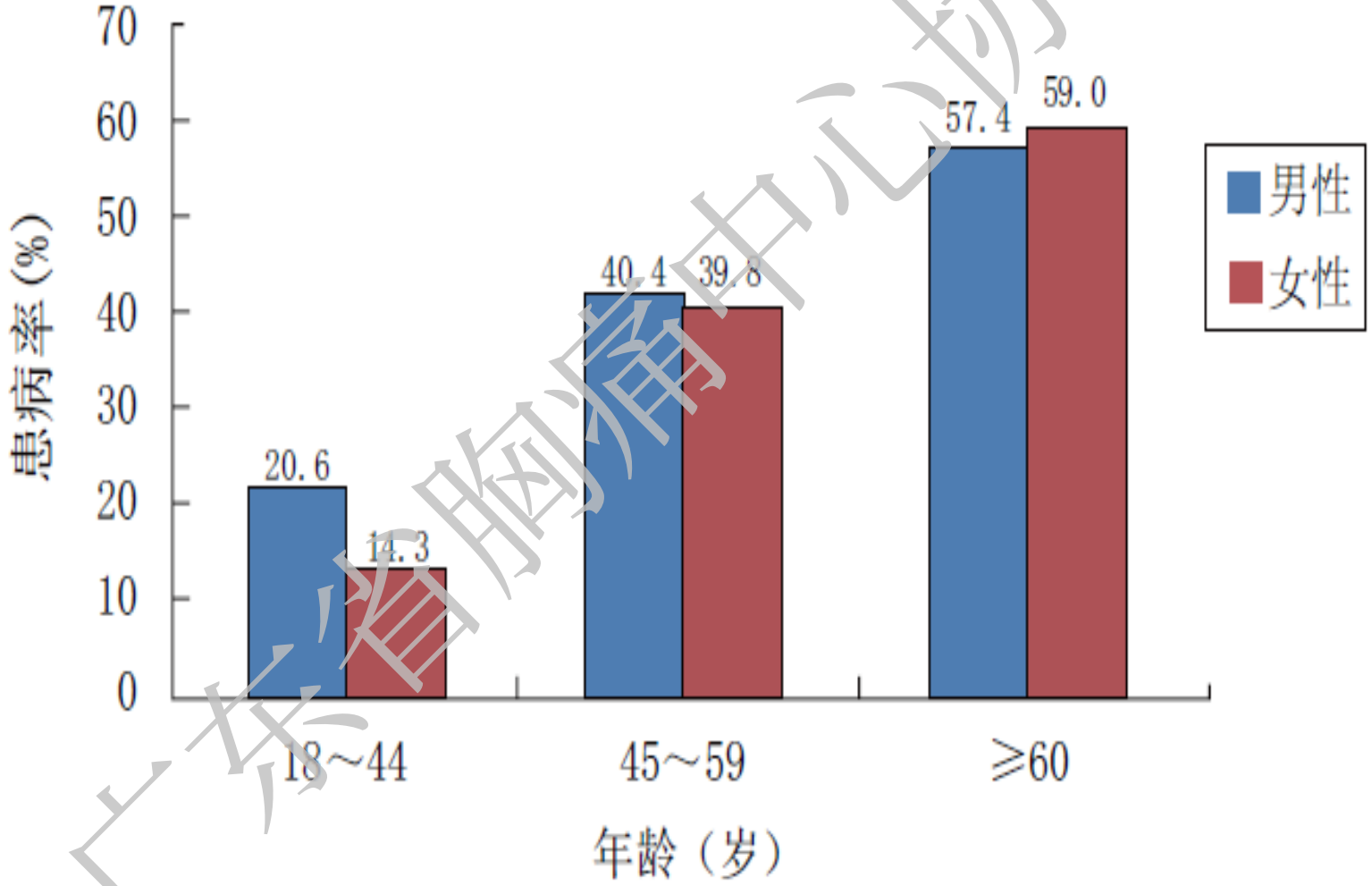
流行病学

人群血压随年龄增加逐渐升高



Hypertension. 2005;45:652

我国十三省市老年高血压患病率



Am J Hypertens, 2014, 27(11): 1355-1361

美国 ISH 随年龄发生比率

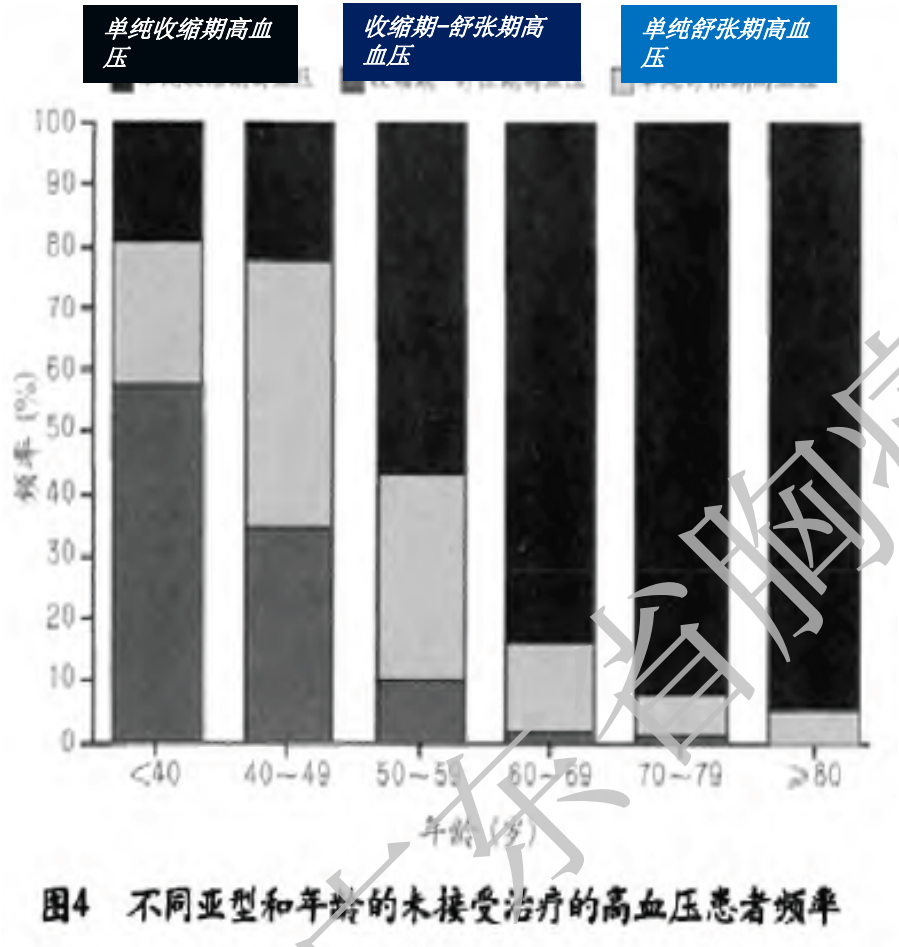


图4 不同亚型和年龄的未接受治疗的高血压患者频率

- ISH 发病率随年龄增加而增加

  年龄>60岁 ISH 占65%

  年龄>70岁 ISH 占90%

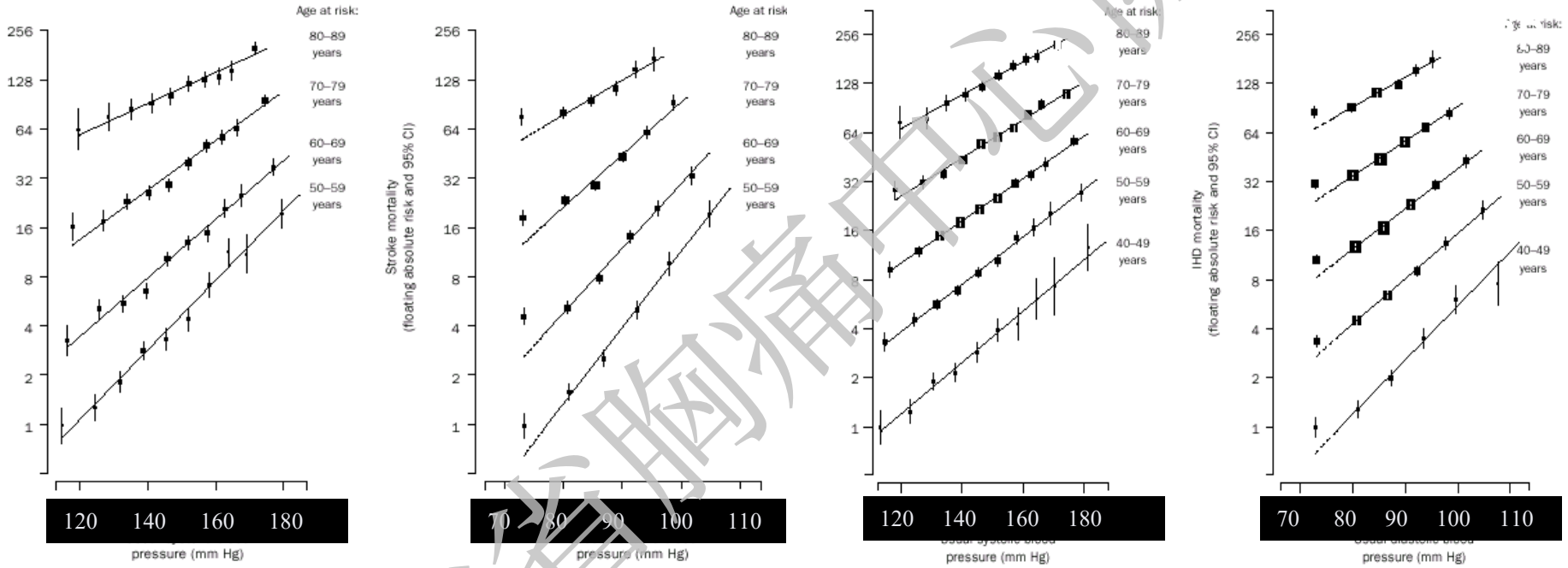
  女性 ISH > 男性

2011年美国心脏病学会基金会/美国心脏协会老年高血压专家共识

老年高血压患者血压水平与心血管死亡相关

Stroke Mortality

CHD Mortality

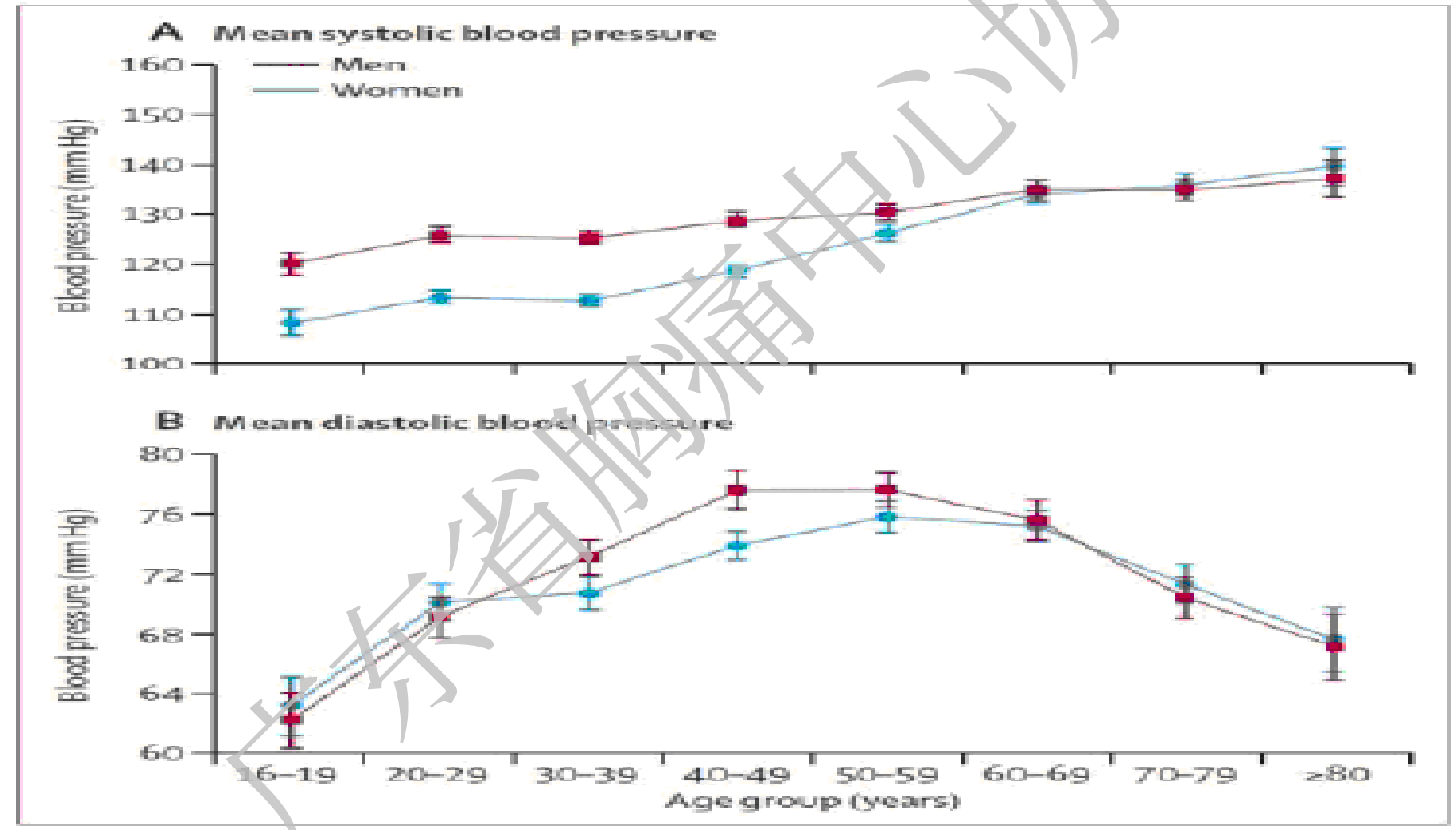


- 61项研究荟萃分析,不同年龄男/女的SBP/DBP与血管疾病死亡呈连续相关(低值至115/175mmHg), SBP 20 mmHg差异与DBP10mmHg差异危险性相关, 脉压影响小。

Lancet 2002; 360:1903

血压的特点

Hypertension management in England:1994-2011
老年高血压患者更多表现为收缩压升高



Lancet 2014;383:1912–19

老年高血压患者血压波动大

中华老年多器官疾病杂志. 2011; 10(3):196-199

中国老年高血压人群晨峰明显

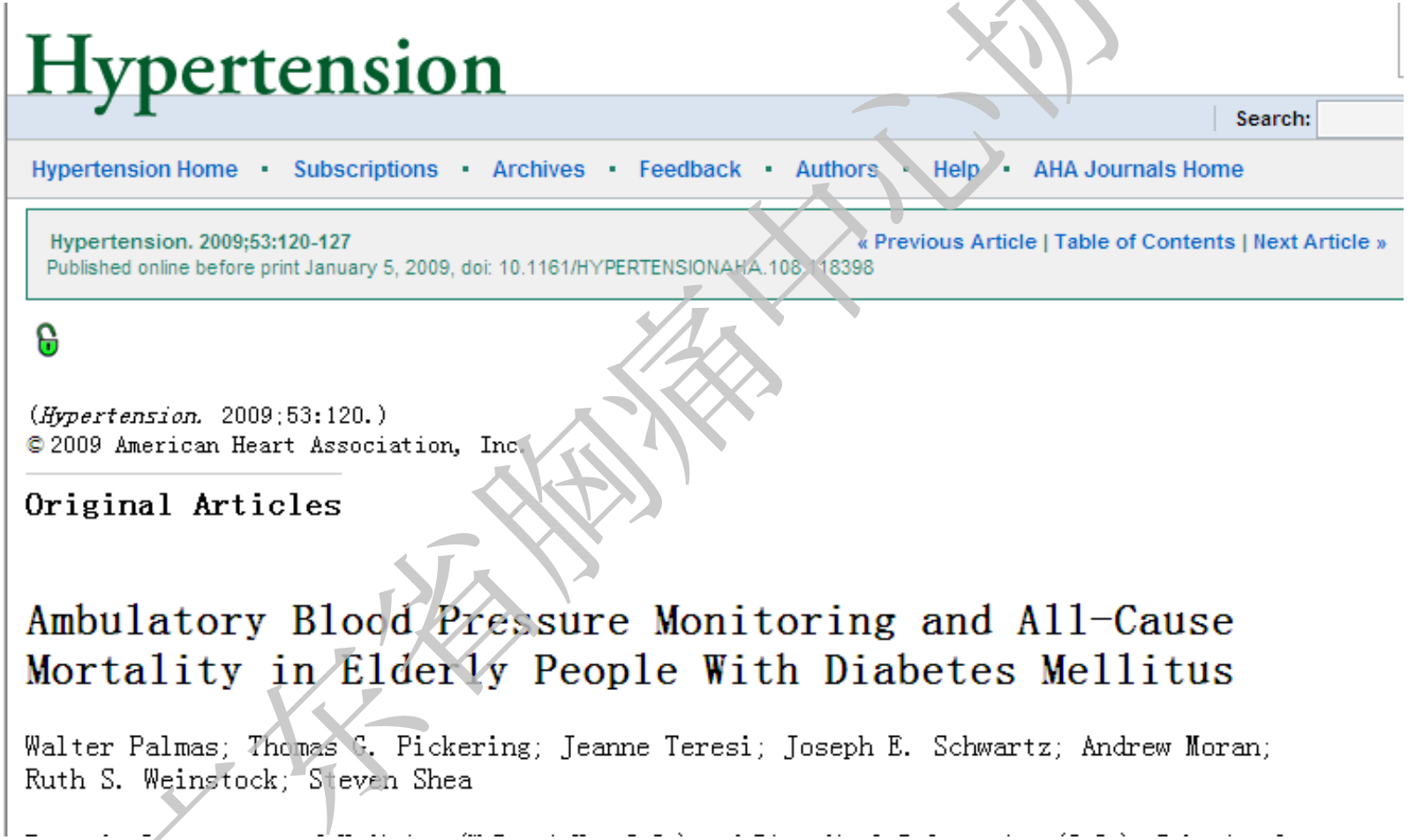
40-79岁高血压患者中晨峰发生率19.4%，

其中超高龄患者21.8%，中年患者5.6%

机制：清晨时交感活性增加，儿茶酚胺类收缩血管物质水平升高；肾素一血管紧张素一醛固酮系统激活，且糖皮质激素分泌增加

Zhonghua Nei Ke Za Zhi. 2011

老年人更多表现为夜间高血压



Hypertension

Search:

Hypertension Home · Subscriptions · Archives · Feedback · Authors · Help · AHA Journals Home

Hypertension. 2009;53:120-127 « Previous Article | Table of Contents | Next Article »
Published online before print January 5, 2009, doi: 10.1161/HYPERTENSIONAHA.108.118398

(*Hypertension.* 2009;53:120.)
© 2009 American Heart Association, Inc.

Original Articles

Ambulatory Blood Pressure Monitoring and All-Cause Mortality in Elderly People With Diabetes Mellitus

Walter Palmas; Thomas G. Pickering; Jeanne Teresi; Joseph E. Schwartz; Andrew Moran; Ruth S. Weinstock; Steven Shea

老年人更多表现为夜间高血压

Office systolic BP, mmHg	143.5±24.7
Office diastolic BP, mmHg	70.7±10.7
Office PP, mmHg	72.8±10.7
Office HR, bpm	72.8±10.9
24-hour systolic BP, mmHg	136.4±16.9
24-hour diastolic BP, mmHg	69.2±8.9
24-hour PP, mmHg	67.2±13.7
Sleep blood pressure pattern, %*	
Dipping	23.3
Nondipping	51.6
Rise	25.1

Hypertension 2009; 53:120

Postural changes in blood pressure and the prevalence of orthostatic hypotension among home-dwelling elderly aged 75 years or older.

Hiitola P[1], Enlund H, Kettunen R, Sulkava R, Hartikainen S.

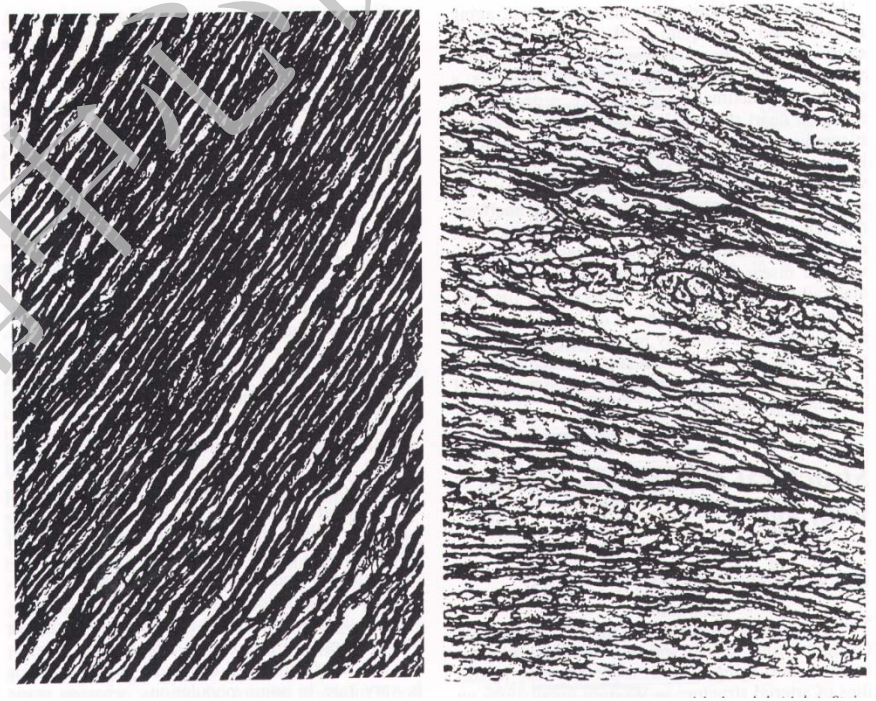
J Hum Hypertens. 2009 Jan;23(1):33-9

体位性低血压在年龄65岁及以上人群总体患病率可达20%～50%，而老年人高血压合并体位性低血压的患者高于上述比例，其心脑血管事件也增高2～3倍

机制

老年人动脉硬化的病因

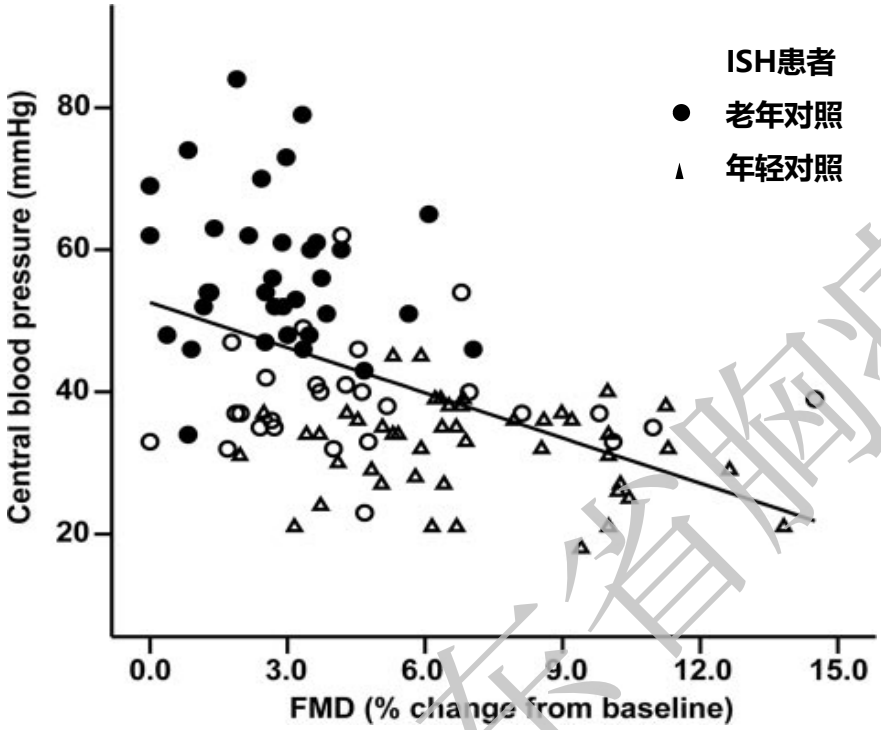
- 弹性纤维蛋白缺乏
- 糖基化产物形成
  ↓
- 胶原蛋白交联
- 胶原蛋白生成增多 (所有)



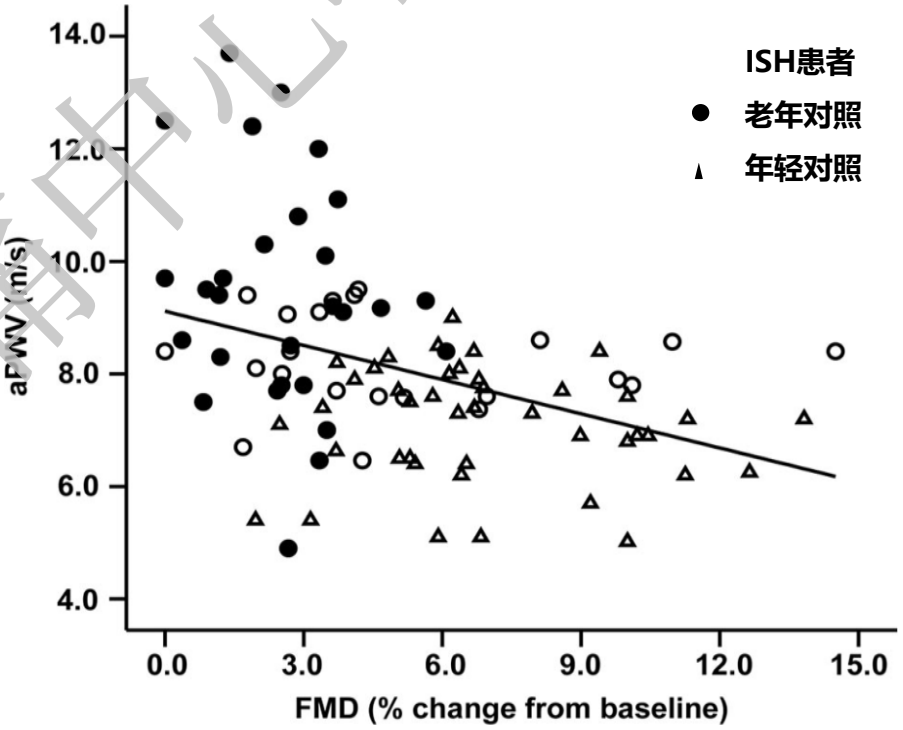
正常动脉　　***ISH*老年人的动脉**

ISH患者内皮功能受损，动脉僵硬度增加

随年龄增长，ISH患者主动脉压升高
FMD明显下降



FMD下降，**aPWV明显上升**

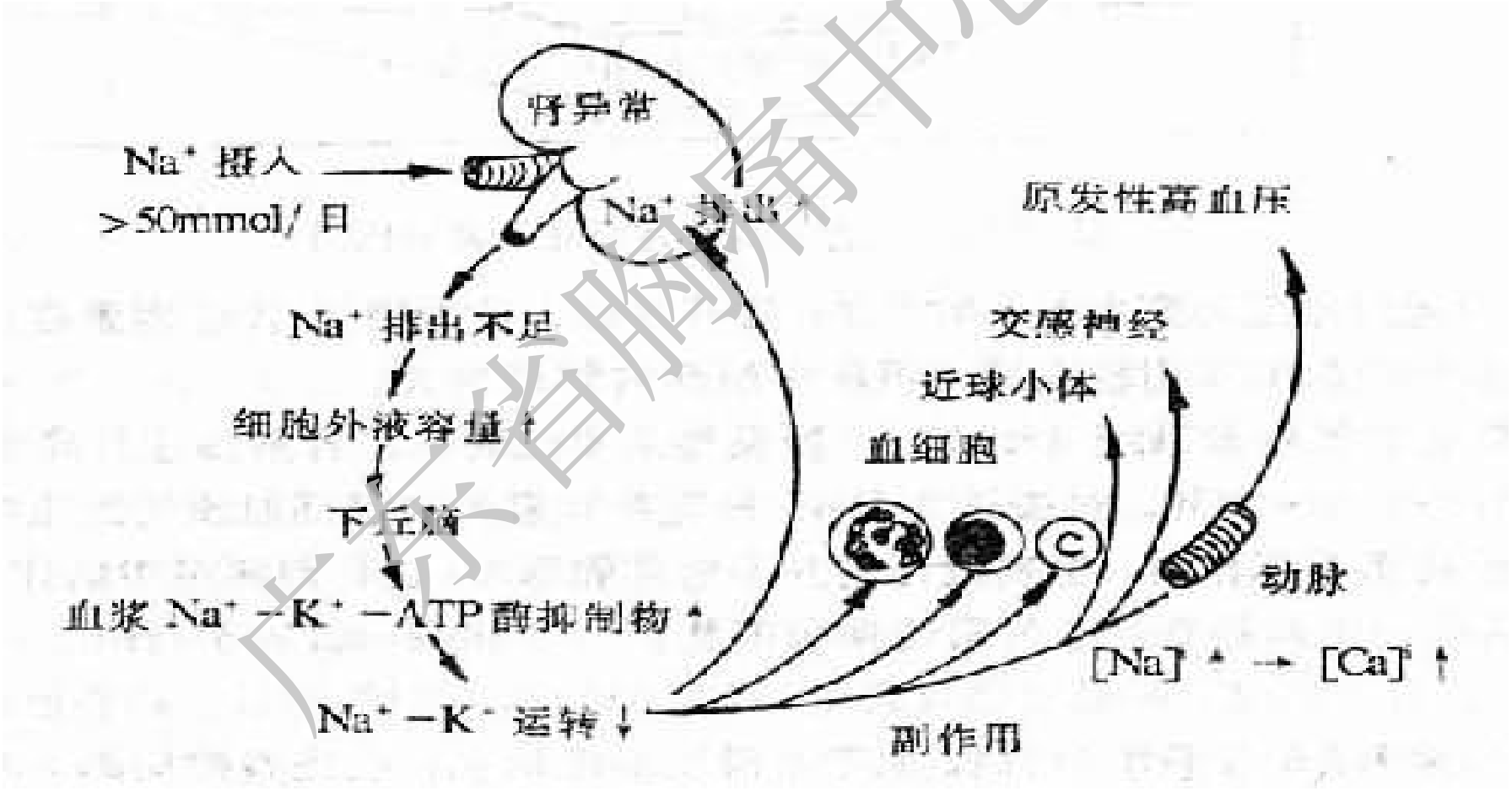


注：
FMD：Flow-mediated Dilation，指血流介导的舒张，评估动脉内皮功能；
aPWV： aortic Pulse Wave Velocity，指大动脉脉搏波速度，评估动脉僵硬度

Hypertension. 2007;50:228-233.

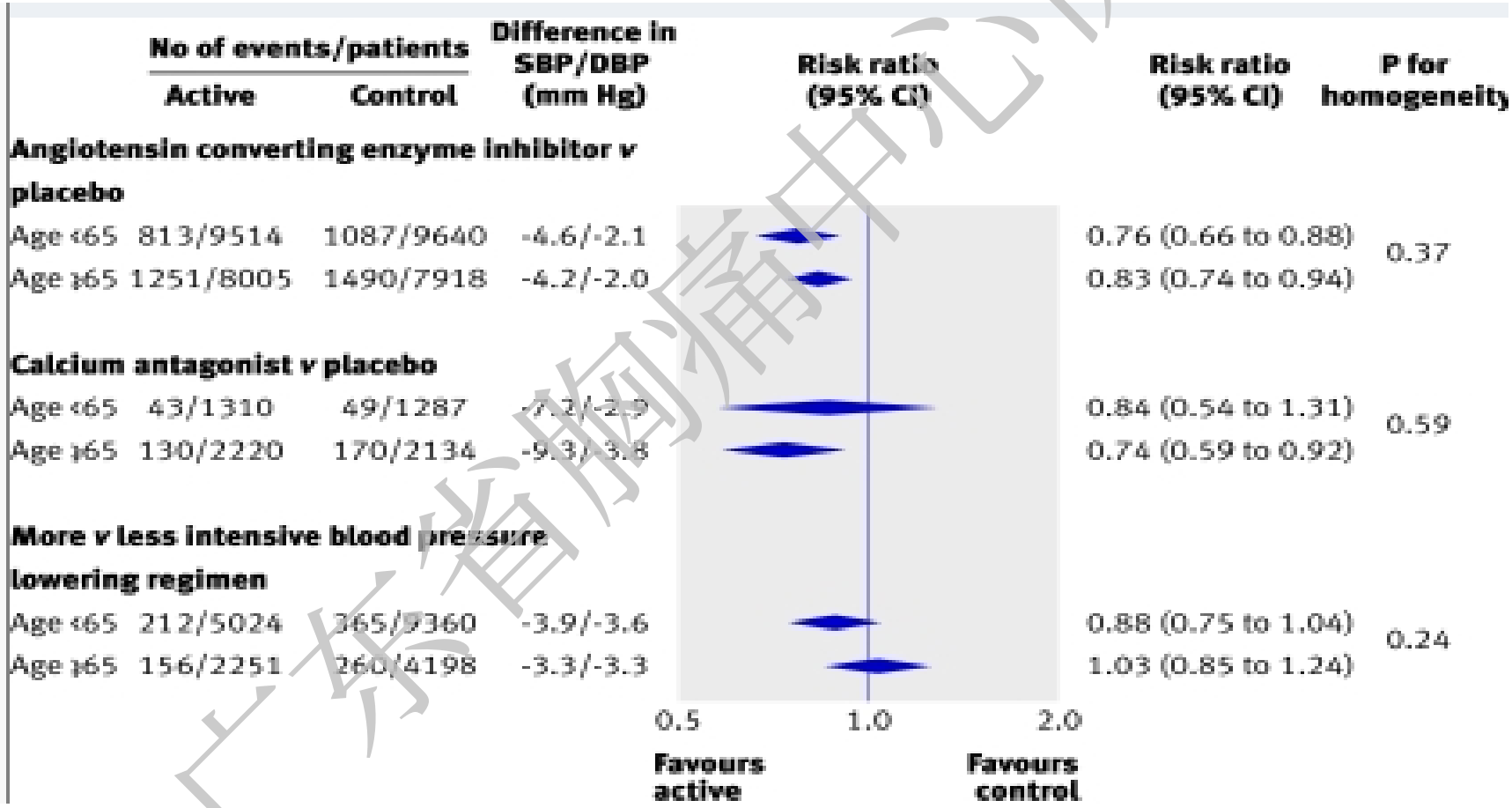
老年人肾脏血流动力学改变及对

水盐（容量）调节的影响，容量负荷增加



目标血压

不同年龄段降压的获益相似



Law M R et al. BMJ 2009;338

既往老年高血压患者的临床研究

Table 1: Summary of important outcome trials for patients in the elderly and very elderly.

Trial	Age of included patients (years)	N	Inclusion Criteria SBP / DBP (mm Hg)	Goal SBP / DBP (mm Hg)	Active Treatment	Control	BP Δ SBP / DBP (mm Hg)	Clinical benefit	Results
SHEP	≥60	4736	160–219 / <90	<160, ↓20	D BB	placebo	–12 / –4	+	↓ CV events (32%) ↓ stroke (36%) ↔ CV mortality
STOP (subgroup)	70–84	1627	≥180 / ≥90 OR DBP >105	<160 / <95	BB D	placebo	–19 SBP	+	↓ CV events (40%) ↓ stroke (46%) ↓ CV mortality (43%)
HYVET	≥80	3845	>160 / <110	<150 / <80	D ACEI	placebo	–15 / –6.1	+	↓ CV events (34%) ↓ stroke (30%) ↓ CV mortality (23%)
SYST.EUR	≥60	4695	160–219 / <95	SBP <150	CCB ACEI D	placebo	–10 / –5	+	↓ CV events (26%) ↓ stroke (42%) ↓ CV mortality (27%)
SCOPE	70–89	4937	160–179 / 90–99	<160 / 90	ARB	placebo	–4.7 / –2,6	+	↓ CV events (11%) ↓ stroke (24%) ↔ CV mortality
LIFE-ISH	55–80	1326	160–200 / <90	≤140 / 90	ARB	BB	–16,7 / –9.0	+	↓ CV events (27%) ↓ stroke (43%) ↓ CV mortality (47%)

Swiss Med Wkly. 2012;142:w13574

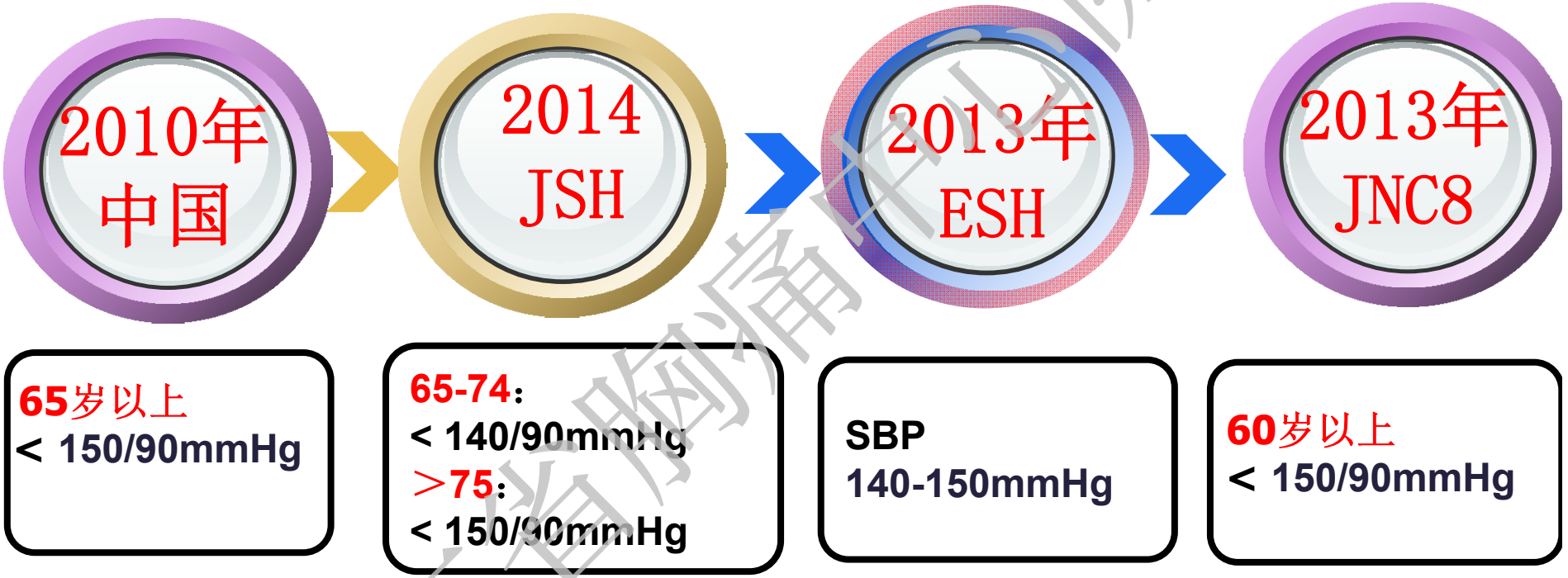
既往老年高血压患者的临床研究

Table 1: Summary of important outcome trials for patients in the elderly and very elderly.

Trial	Age of included patients (years)	N	Inclusion Criteria SBP / DBP (mm Hg)	Goal SBP / DBP (mm Hg)	Active Treatment	Control	BP Δ SBP / DBP (mm Hg)	Clinical benefit	Results
SHEP	≥60	4736	160–219 / <90	<160, ↓20	D BB	placebo	–12 / –4	+	↓ CV events (32%) ↓ stroke (36%) ↔ CV mortality
STOP (subgroup)	70–84	1627	≥180 / ≥90 OR DBP >105	<160 / <95	BB D	placebo	–19 SBP	+	↓ CV events (40%) ↓ stroke (46%) ↓ CV mortality (43%)
HYVET	≥80	3845	>160 / <110	<150 / <80	D ACEI	placebo	–15 / –6.1	+	↓ CV events (34%) ↓ stroke (30%) ↓ CV mortality (23%)
SYST.EUR	≥60	4695	160–219 / <95	SBP <150	CCB ACEI D	placebo	–10 / –5	+	↓ CV events (26%) ↓ stroke (42%) ↓ CV mortality (27%)
SCOPE	70–89	4937	160–179 / 90–99	<160 / 90	ARB	placebo	–4.7 / –2,6	+	↓ CV events (11%) ↓ stroke (24%) ↔ CV mortality
LIFE-ISH	55–80	1326	160–200 / <90	≤140 / 90	ARB	BB	–16,7 / –9.0	+	↓ CV events (27%) ↓ stroke (43%) ↓ CV mortality (47%)

Swiss Med Wkly. 2012;142:w13574

老年患者目标血压



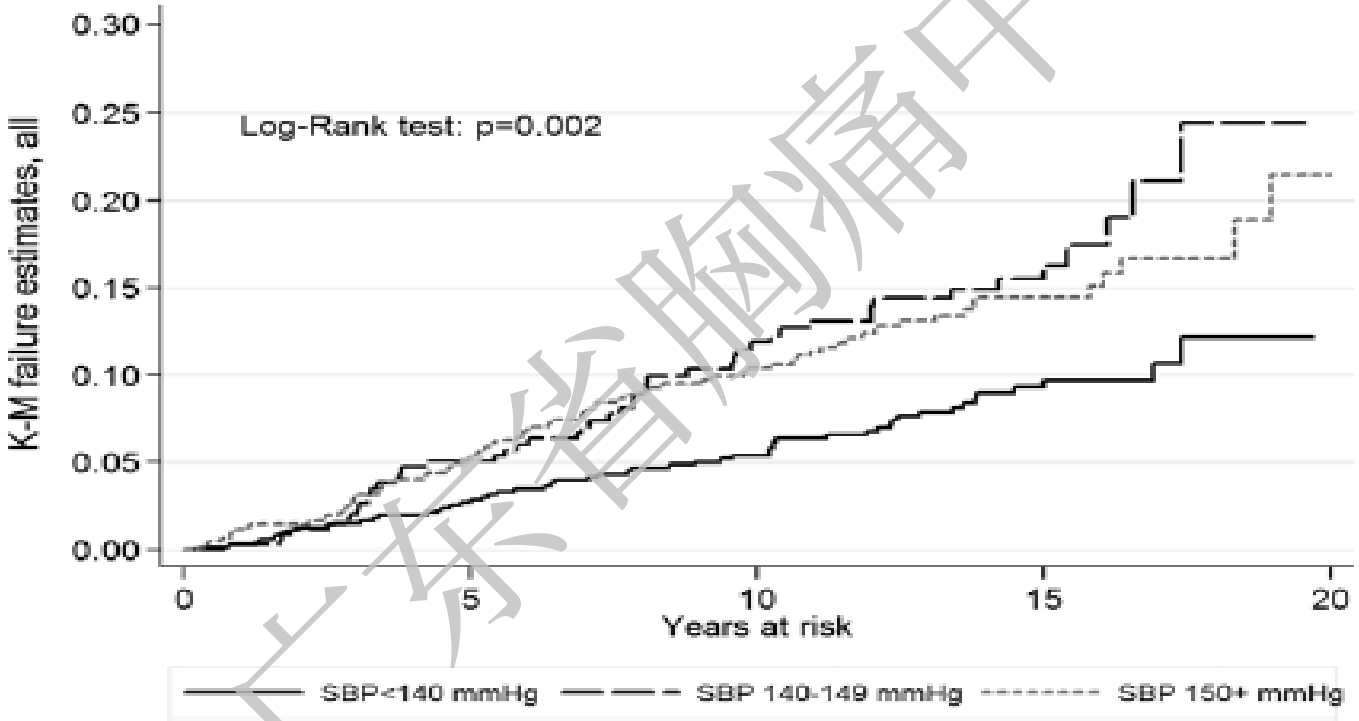
2015TSOC/THS, 2017CHEP: 80岁以上

< 150/90mmHg

Evidence to Maintain the Systolic Blood Pressure Treatment Threshold at 140 mm Hg for Stroke Prevention

The Northern Manhattan Study

Hypertension. 2016;67:520-526



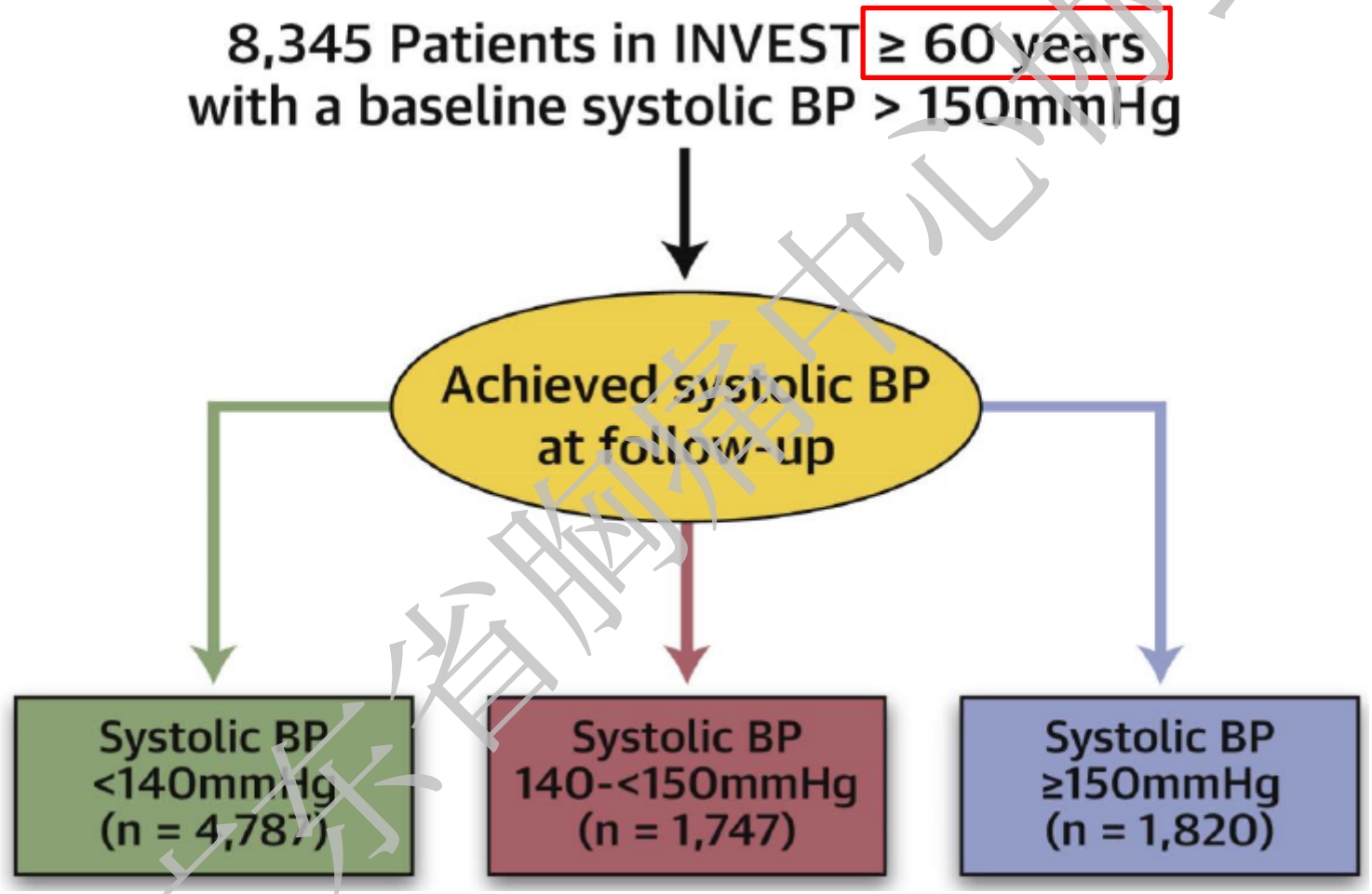
1750 aged ≥60 years and free of stroke, diabetes mellitus, and chronic kidney disease had SBP measured at baseline and were annually followed up for incident stroke.

在DBP<90mmHg老年人中，SBP仍然与卒中相关

BP, mmHg	All						without Baseline BP Medications					
	N	No. cases	Crude rate	HR (95% CI)*	P	P_{Het}†	N	No. cases	Crude rate	HR (95% CI)*	P	P_{Het}†
						All						
SBP<140 and DBP<90	683	52	6.6	Ref.			528	36	5.8	Ref.		
SBP 140-149 and DBP<90	251	35	12.0	1.64 (1.06 - 2.55)	0.028		144	16	9.3	1.49 (0.82 - 2.72)	0.191	
SBP ≥150 or DBP≥90	816	95	10.2	1.44 (1.00 - 2.07)	0.052		372	43	10.0	1.64 (1.04 - 2.58)	0.034	
Total	1750	182	9.1				1044	95	7.8			

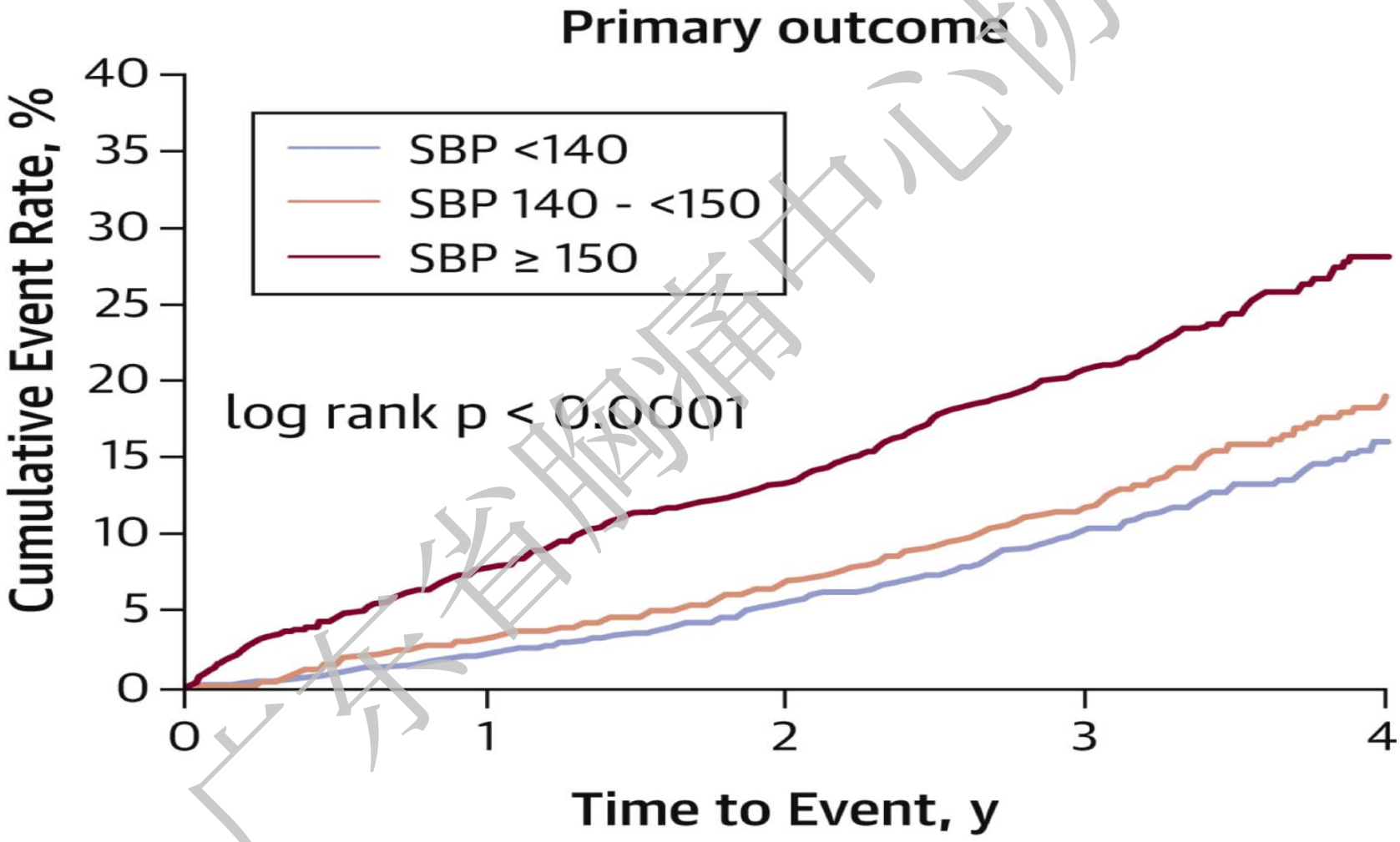
Hypertension. 2016;67:520-526

重审JNC8推荐的血压目标值：INVEST研究



J Am Coll Cardiol. 2014;64:784-93

严格控制血压（<140/90）显著减少复合事件发生率



Bangalore et al. J Am Coll Cardiol 2014;64:784–93

Original Investigation

Intensive vs Standard Blood Pressure Control and Cardiovascular Disease Outcomes in Adults Aged ≥75 Years

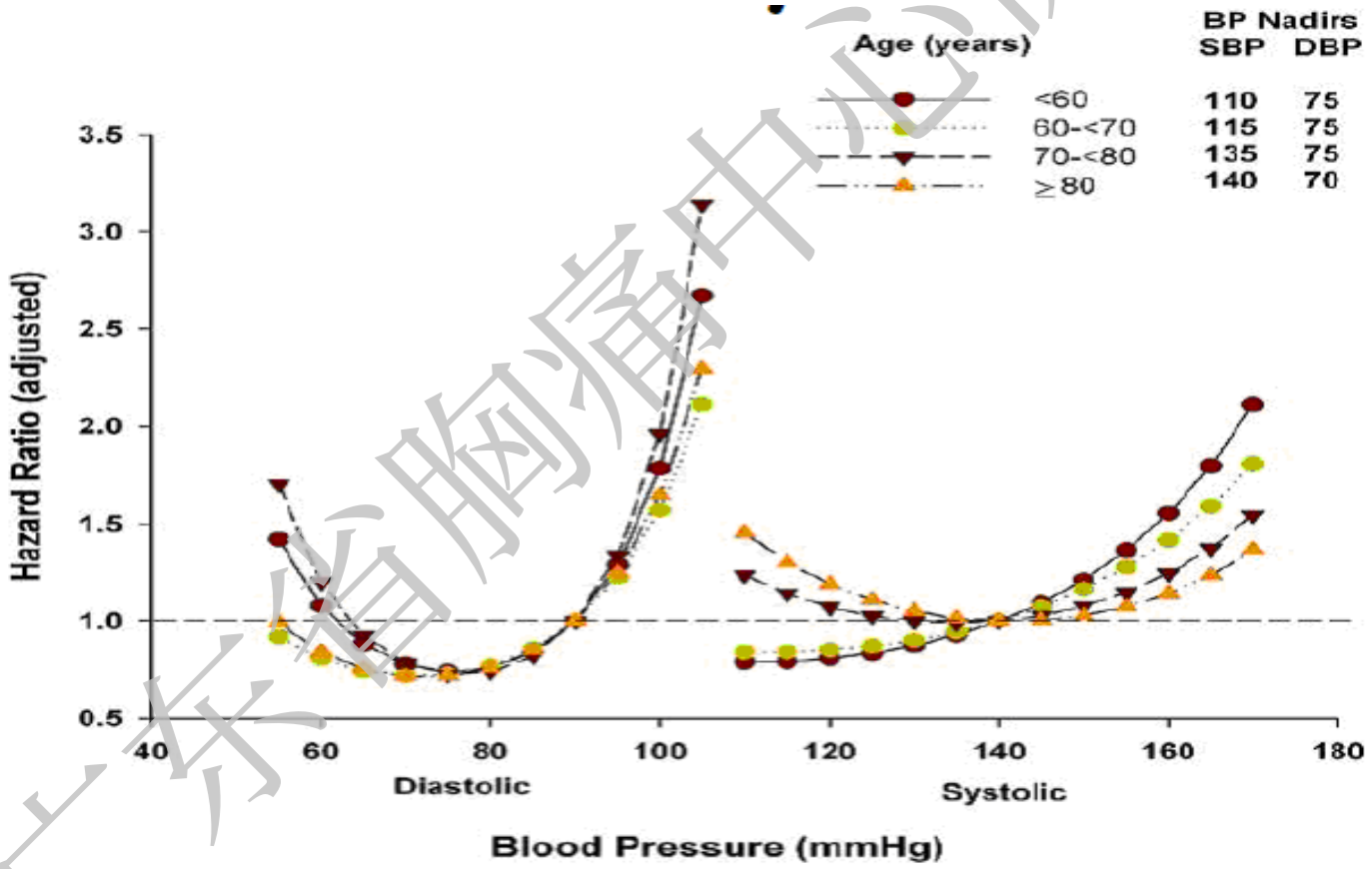
A Randomized Clinical Trial

	Intensive Treatment		Standard Treatment			
	No. With Outcome Events (n = 1317)[a]	% (95% CI) With Outcome Events/y	No. With Outcome Events (n = 1319)[a]	% (95% CI) With Outcome Events/y	HR (95% CI)[b]	*P* Value
All participants						
Cardiovascular disease primary outcome[c]	102	2.59 (2.13-3.14)	148	3.85 (3.28-4.53)	0.66 (0.51-0.85)	.001
Myocardial infarction (MI)[d]	37	0.92 (0.67-1.27)	53	1.34 (1.02-1.75)	0.69 (0.45-1.05)	.09
ACS not resulting in MI[d]	17	0.42 (0.26-0.68)	17	0.42 (0.26-0.68)	1.03 (0.52-2.04)	.94
Stroke[d]	27	0.67 (0.46-0.97)	34	0.85 (0.61-1.19)	0.72 (0.43-1.21)	.22
Heart failure[d]	35	0.86 (0.62-1.20)	56	1.41 (1.09-1.83)	0.62 (0.40-0.95)	.03
Cardiovascular disease death[d]	18	0.44 (0.28-0.70)	29	0.72 (0.50-1.03)	0.60 (0.33-1.09)	.09
Nonfatal MI	37	0.92 (0.67-1.27)	53	1.34 (1.02-1.75)	0.69 (0.45-1.05)	.09
Nonfatal stroke	25	0.62 (0.42-0.91)	33	0.83 (0.59-1.16)	0.68 (0.40-1.15)	.15
Nonfatal heart failure	35	0.86 (0.62-1.20)	55	1.39 (1.06-1.81)	0.63 (0.40-0.96)	.03
All-cause mortality	73	1.78 (1.41-2.24)	107	2.63 (2.17-3.18)	0.67 (0.49-0.91)	.009
Primary outcome plus all-cause mortality	144	3.64 (3.09-4.29)	205	5.31 (4.63-6.09)	0.68 (0.54-0.84)	<.001

2636 aged 75 years or older who participated in the Systolic Blood Pressure Intervention Trial (SPRINT).

JAMA. 2016 May 19

INVEST :年龄越大J-curve更明显



Am J med 2010;123:719-726

2017加拿大高血压教育计划(CHEP)

对于高危患者:

存在临床型或亚临床型心血管疾病

或慢性肾病

或弗莱明翰评分10年心血管病风险＞15%

或年龄≥75岁

或具有其他需要强化降压指征者

若年龄≥50岁且收缩压≥130 mmHg，应考虑予以强化降压治疗，目标值为≤120 mmHg。

药物选择

老年高血压降压药物选择

- 常用降压药物包括CCB、ACEI、ARB、利尿剂和β受体阻滞剂五类，以及由上述药物组成的固定配比复方制剂均可以选用。

- 理想药物应符合以下条件：平稳，有效；安全，不良反应少；服药简单，依从性好

- α受体阻滞剂亦可应用伴良性前列腺增生的患者及难治性高血压的辅助用药。

老年高血压的降压治疗研究

研究涉及的药物方案主要是利尿剂、CCB和ACEI/ARB

Table 1. Trials of Antihypertensive Treatment in the Elderly

Trial Name (Reference)	N	Age Range (y)	Mean Age (y)	Drug(s)	% Risk Reduction						
					CVA	MI	Hospitalization for CHF	Total CVD (or All CV Events)	All-Cause Mortality	CV Mortality	Response to Therapy Same Above Mean Age
ACCOMPLISH (8)	11,506	≥55	68	(Benazepril amlodipine) versus (benazepril + HCTZ)	16	NR	↑ 4	17*	10	20*	Yes†
ALLHAT (9)	33,357	≥55	67	Amlodipine versus chlorthalidone	7	No difference	↑ 38*	↑ 4	4	NR	Yes
				Lisinopril versus chlorthalidone	↑ 15*	↑ 5	↑ 19*	↑ 10*	No difference	NR	Yes
ANBP 2 (10)	6,083	65–84	72	ACE inhibitors versus diuretics	↑ 2	14	15	11*	10	NR	Yes
Coope and Warrender (11)	884	60–79	68	Atenolol + bendrofluazide	42	−3	32	24	3	22	Stroke only
EWPHE (12)	840	≥60	72	HCTZ + triamterene + methyldopa	36	20	22	29	9	27*	NR
HYVET (4)	3,845	80–105	84	Indapamide + perindopril	30	NR	64*	34*	21*	23	Yes‡
INVEST (13)	22,576	≥50	66	Verapamil versus atenolol	No difference	No difference	No difference	No difference	No difference	No difference	Yes§
LIFE (14)	9,193	55–80	67	Losartan versus atenolol	25*	NR	3	13*	10	11	NR
MRC (15)	4,396	65–74	70	Atenolol + HCTZ or amiloride	25*	19	NR	17*	3	9	Yes‡
SHEP (16)	4,736	≥60	72	Chlorthalidone	36*	25	55	32	13	20	NR
STONE (17)	1,632	60–79	67	Nifedipine	57*	6	68	60*	45	26	Yes‡
STOP-HTN (18)	1,627	70–84	76	Atenolol + HCTZ or amiloride or metroprolol or pinodolol	47	13	51	40	43	50	Yes‡
Syst-China (19)	2,394	≥60	67	Nitrendipine captopril HCTZ	38*	33	38	37*	39*	39*	All but CV mortality
Syst-Eur (20)	4,695	≥60	70	Nitrendipine	42	26	36	31	14	27	NR
VALUE (21)	15,245	≥50	67	Amlodipine versus valsartan	↑ 15	NR	11	↑ 6	↑ 4	NR	NR

JACC 2011；57:2037–2114

JNC指南

老年高血压推荐降压治疗起始药物

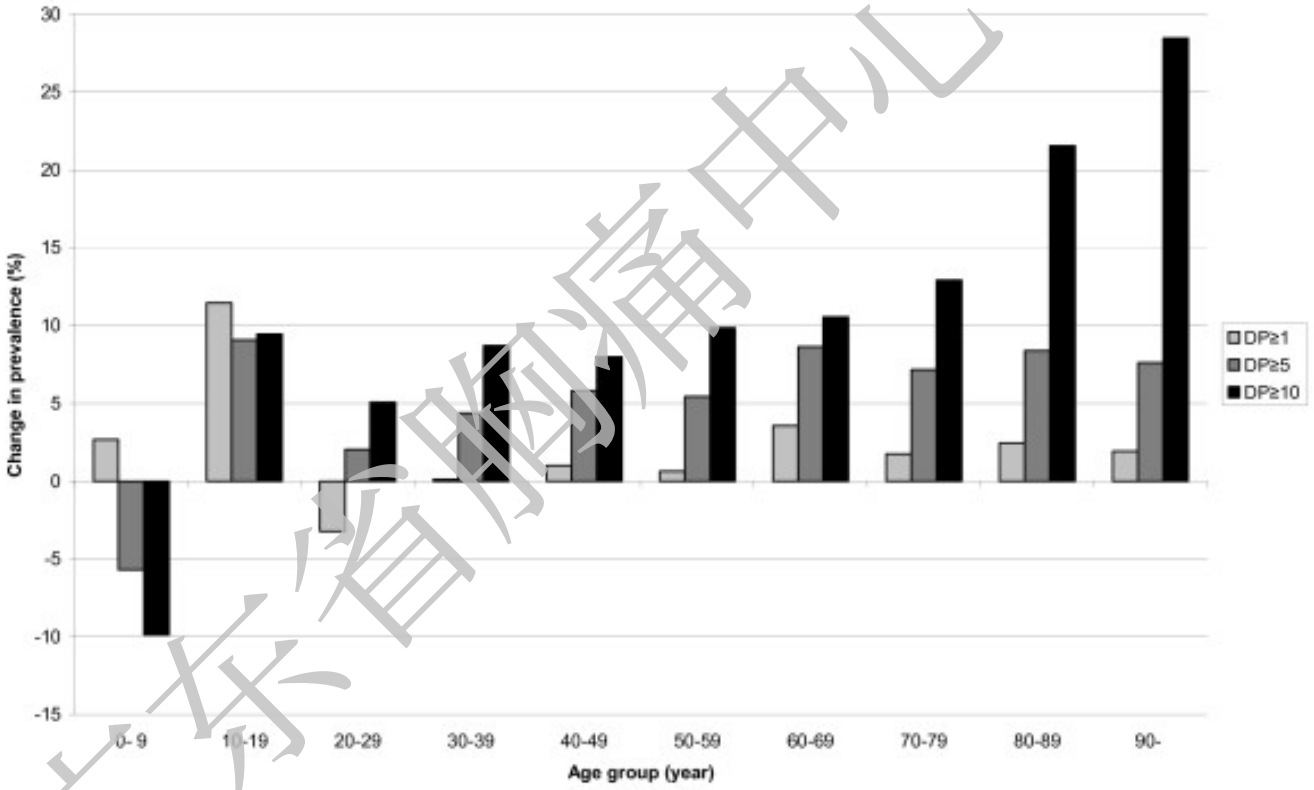
指南	年份	推荐药物
JNC 1	1977	利尿剂
JNC 2	1980	利尿剂
JNC 3	1984	利尿剂
JNC 4	1988	利尿剂，CCB 或 ACEI
JNC 5	1993	利尿剂
JNC 6	1997	利尿剂
JNC 7	2003	利尿剂 或CCB 或ACEI/ARB
JNC 8	2012	利尿剂或CCB

老年难治性高血压

存在下述原因？

- 生活方式干预：高盐；少运动，焦虑，肥胖
- 阻塞性睡眠呼吸暂停（OSA）
- 继发性高血压
- 服用影响高血压的药物：甘草、避孕药、类固醇及麻黄素

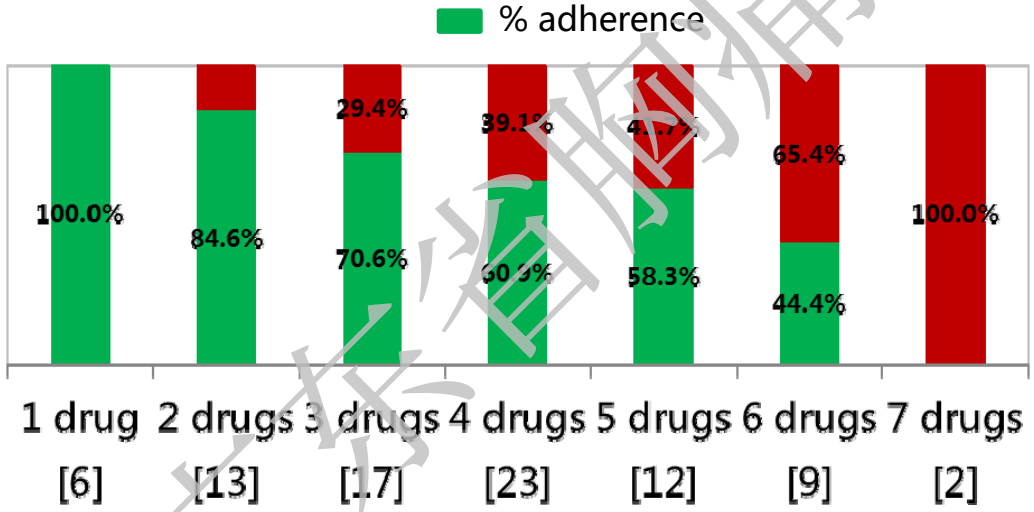
老年人服药片数多



BMC Clin Pharmacol. 2010; 10: 16.

单片复方制剂使依从性升高

Non Adherence	New referrals	Follow up	Referal Renal denervation
% Complete	8.8	9.1	33.5
% Partial	9.6	28.8	0
Any	18.4	37.9	33.5



Non-adherence
（complete or partial）
3 drugs 30%
4 drugs 40%
6 drugs 55%
7 drugs 100%

Tomaszewski et al. Heart 2014

总　结

- 随着我国老年人群及高血压人人群的增加，老年高血压患者逐年增加
- 老年高血压患者的病理生理和临床表现具有特殊性。
- 良好的血压控制是减少心脑血管事件的基本途径。应关注老年高血压患者的降压时机及目标血压
- 选择有效、安全和简便的降压治疗方案，实现平稳持久控制血压对老年高血压患者具有重要意义