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Things We Do For No Reason (TWDFNR)

ACP Delaware Chapter Meeting

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Disclosures

None

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Choosing Wisely®: Things We Do for No Reason

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Journal of Hospital Medicine: @TWDFNR

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Choosing Wisely®

An initiative of the ABIM Foundation

The ABIM Foundation's mission for the Choosing Wisely® campaign is to promote conversations between clinicians and patients by helping patients choose care that is supported by evidence, not duplicative of other tests or procedures already received, free from harm, and truly necessary. Hospitalists can incorporate the Choosing Wisely® recommendation(s) into daily practice. Visit the Choosing Wisely website for a complete overview.

JOHNS HOPKINS MEDICINE

Outcomes, Safety, Quality, Experience

Harms, Costs, Burden

Two Objectives

1. Don’t use oxygen to treat acute illness without hypoxemia*.

2. Avoid PRN anti-hypertensives for asymptomatic severe hypertension

Case 1

Mr. Herzman is a 67-year-old man with history of hypertension and diabetes. He was hospitalized for management of chest pain attributed to NSTEMI.

He is chest pain free, vital signs are normal, and his SpO2 is 98% on RA. Cardiac catheterization is planned in the morning.

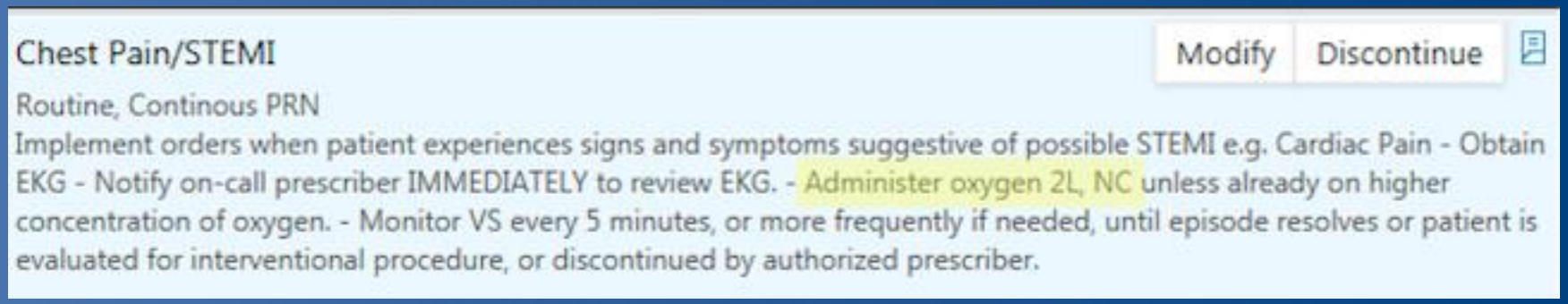
He arrives on the ward on supplemental oxygen, 2L NC, which was started “for comfort”

Use oxygen to treat hypoxemia,

Don’t use oxygen when hypoxemia is absent.

Use oxygen for hypoxemia, not for acute illness.

- Oxygen is life-saving in hypoxemia.
- Oxygen use, absent hypoxemia, is common and generally considered benign.



Liberal oxygen therapy doesn't improve outcomes in patients with acute MI.

DETO2X-AMI

Registry-based RCT

- P: 6,629 adults
  - acute cardiac chest pain,
  - AND positive cardiac biomarkers
  - AND SpO_2 > 90%
- I: 6L face mask x 6-12 hours
- C: ambient air
- O: death from any cause at 1 year

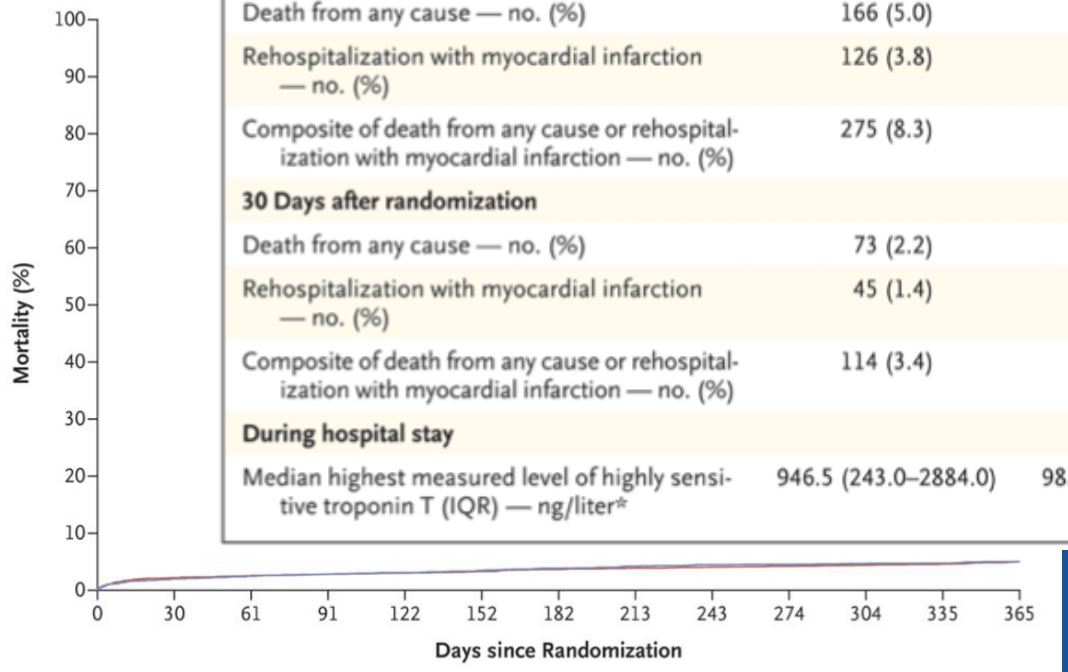
Hofmann et al NEJM 2017; 377:1240-1249

Oxygen doesn't impact mortality or secondary outcomes

JOHNS HOPKINS MEDICINE

Table 3. End Points during and after Hospitalization.

Timing and End Point	Oxygen Group (N=3311)	Ambient-Air Group (N=3318)	Hazard Ratio (95% CI)	P Value
365 Days after randomization				
Death from any cause — no. (%)	166 (5.0)	168 (5.1)	0.97 (0.79–1.21)	0.80
Rehospitalization with myocardial infarction — no. (%)	126 (3.8)	111 (3.3)	1.13 (0.88–1.46)	0.33
Composite of death from any cause or rehospitalization with myocardial infarction — no. (%)	275 (8.3)	264 (8.0)	1.03 (0.87–1.22)	0.70
30 Days after randomization				
Death from any cause — no. (%)	73 (2.2)	67 (2.0)	1.07 (0.77–1.50)	0.67
Rehospitalization with myocardial infarction — no. (%)	45 (1.4)	31 (0.9)	1.46 (0.92–2.31)	0.11
Composite of death from any cause or rehospitalization with myocardial infarction — no. (%)	114 (3.4)	95 (2.9)	1.19 (0.91–1.56)	0.21
During hospital stay				
Median highest measured level of highly sensitive troponin T (IQR) — ng/liter*	946.5 (243.0–2884.0)	983.0 (225.0–2931.0)	—	0.97



No. at Risk

Oxygen treatment	3311	3238	3227	3218	3210	3201	3189	3182	3175	3170	3165	3159	3145
Ambient air	3318	3251	3235	3224	3215	3202	3190	3177	3169	3166	3162	3160	3150

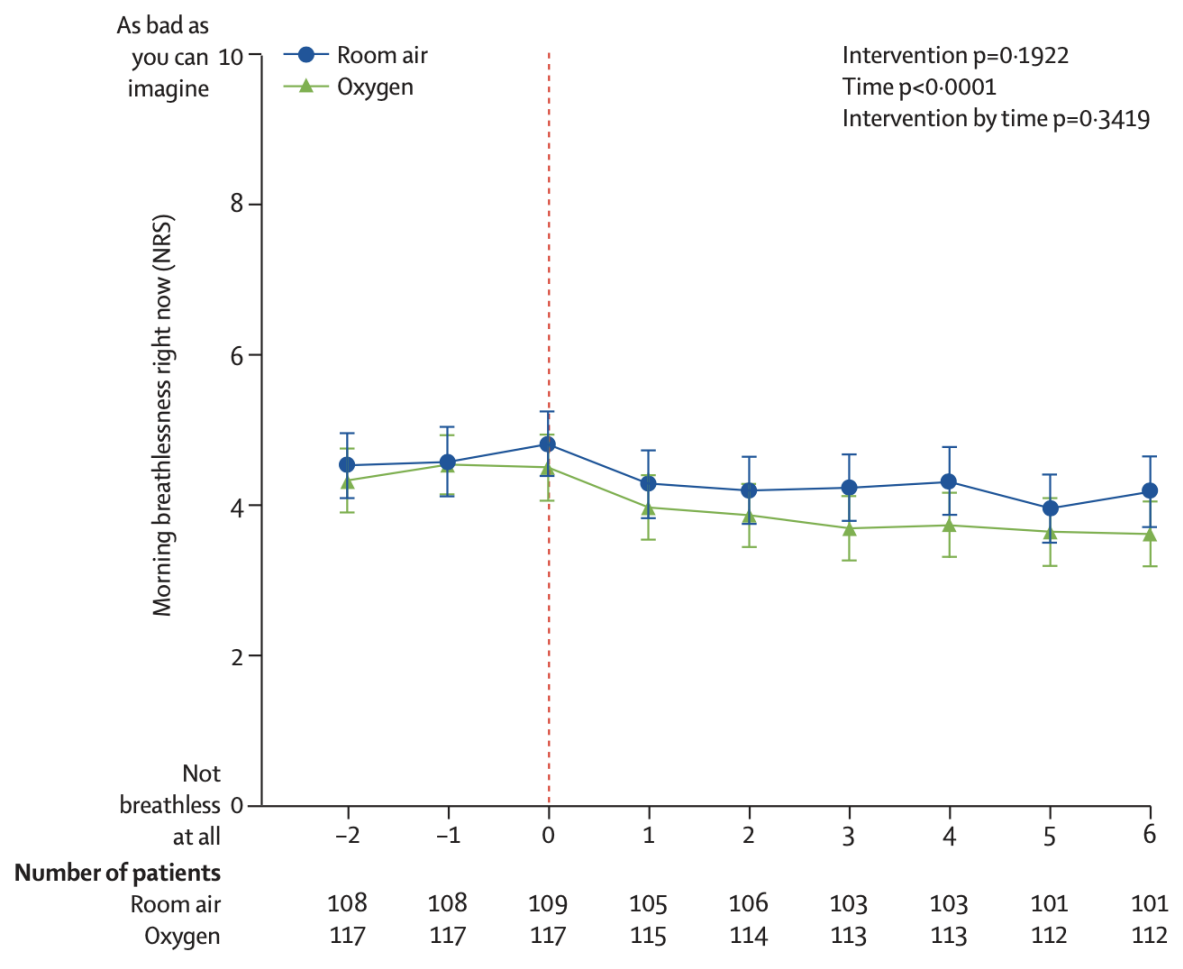
Hofmann et al NEJM 2017; 377:1240-1249

Palliative oxygen therapy may not improve symptoms in breathless life-limited patients.

Effect of palliative oxygen versus room air in relief of breathlessness in patients with refractory dyspnoea: a double-blind, randomised controlled trial

Amy P Abernethy, Christine F McDonald, Peter A Frith, Katherine Clark, James E Herndon II, Jennifer Marcello, Iven H Young, Janet Bull, Andrew Wilcock, Sara Booth, Jane L Wheeler, James A Tulsky, Alan J Crockett, David C Currow

- P: 239 adults with life-limiting illness, refractory dyspnea & PaO2 > 55 mmHg
- I: 2L NC via concentrator
- C: Room air via concentrator
- O: Breathlessness right now [0-10 NRS]



Oxygen provides no additional relief of refractory dyspnea compared with room air.

Liberal oxygen therapy can hurt.

BMJ

RESEARCH

Effect of high flow oxygen on mortality in chronic obstructive pulmonary disease patients in prehospital setting: randomised controlled trial

Prehospital unblinded RCT

- P: 405 adults with presumed AECOPD
- I: Titrated O2 via NC - target SpO2 88-92%
- C: Fixed 8-10L via facemask
- O: Mortality

Mortality	Fixed	Titrated	P value
All Patients	21 / 226 (9%)	7 / 179 (4%)	0.02
Confirmed COPD	11 / 117 (9%)	2 / 97 (2%)	0.04

COPD	Fixed	Titrated	P value
pH	7.29 (0.15)	7.41 (0.09)	0.01
pCO2	76.5 (50.2)	42.9 (14.2)	0.02

Liberal oxygen therapy can hurt.

Not just patients with COPD.

Mortality and morbidity in acutely ill adults treated with liberal versus conservative oxygen therapy (IOTA): a systematic review and meta-analysis

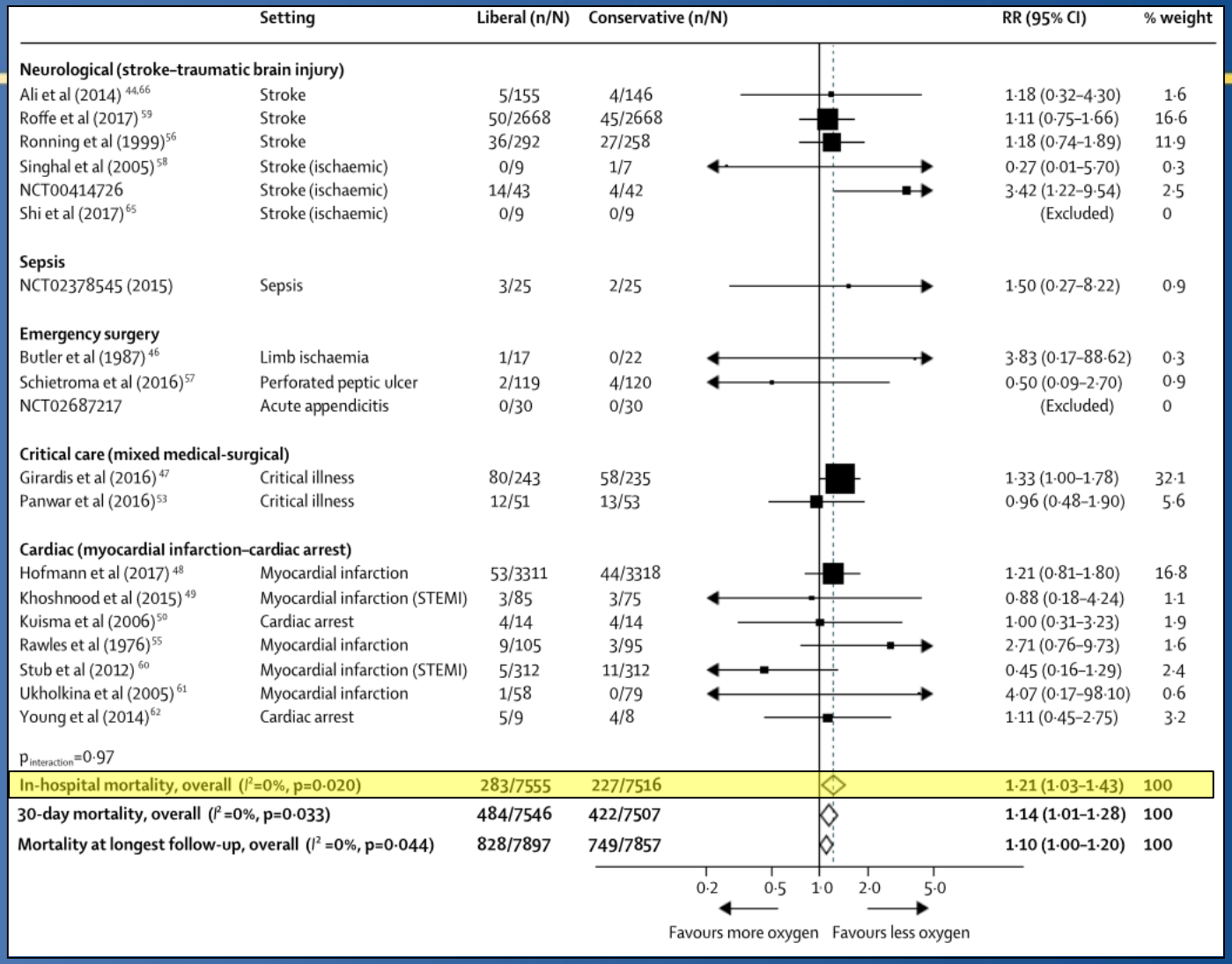
Derek K Chu†, Lisa H-Y Kim*†, Paul J Young, Nima Zamiri, Saleh A Almenawer, Roman Jaeschke, Wojciech Szczeklik, Holger J Schünemann, John D Neary, Waleed Alhazzani*

- 25 RCTs,
- 16,037 adults
- diverse illnesses:
  - MI, cardiac arrest
  - stroke
  - sepsis, critical illness
  - trauma, surgery

- Liberal O_2 :
  - Median FiO2: 0.52
  - Median duration: 8 hours
- Conservative O_2:
  - Median FiO2: 0.21

Chu et al, Lancet 2018; 391:1693-705

Liberal O2 ↑ in-hospital mortality.



	Setting	Liberal (n/N)	Conservative (n/N)	RR (95% CI)	% weight
Neurological (stroke–traumatic brain injury)					
Ali et al (2014) [44,66]	Stroke	5/155	4/146	1·18 (0·32–4·30)	1·6
Roffe et al (2017) [59]	Stroke	50/2668	45/2668	1·11 (0·75–1·66)	16·6
Ronning et al (1999) [56]	Stroke	36/292	27/258	1·18 (0·74–1·89)	11·9
Singhal et al (2005) [58]	Stroke (ischaemic)	0/9	1/7	0·27 (0·01–5·70)	0·3
NCT00414726	Stroke (ischaemic)	14/43	4/42	3·42 (1·22–9·54)	2·5
Shi et al (2017) [65]	Stroke (ischaemic)	0/9	0/9	(Excluded)	0
Sepsis					
NCT02378545 (2015)	Sepsis	3/25	2/25	1·50 (0·27–8·22)	0·9
Emergency surgery					
Butler et al (1987) [46]	Limb ischaemia	1/17	0/22	3·83 (0·17–88·62)	0·3
Schietroma et al (2016) [57]	Perforated peptic ulcer	2/119	4/120	0·50 (0·09–2·70)	0·9
NCT02687217	Acute appendicitis	0/30	0/30	(Excluded)	0
Critical care (mixed medical-surgical)					
Girardis et al (2016) [47]	Critical illness	80/243	58/235	1·33 (1·00–1·78)	32·1
Panwar et al (2016) [53]	Critical illness	12/51	13/53	0·96 (0·48–1·90)	5·6
Cardiac (myocardial infarction–cardiac arrest)					
Hofmann et al (2017) [48]	Myocardial infarction	53/3311	44/3318	1·21 (0·81–1·80)	16·8
Khoshnood et al (2015) [49]	Myocardial infarction (STEMI)	3/85	3/75	0·88 (0·18–4·24)	1·1
Kuisma et al (2006) [50]	Cardiac arrest	4/14	4/14	1·00 (0·31–3·23)	1·9
Rawles et al (1976) [55]	Myocardial infarction	9/105	3/95	2·71 (0·76–9·73)	1·6
Stub et al (2012) [60]	Myocardial infarction (STEMI)	5/312	11/312	0·45 (0·16–1·29)	2·4
Ukholkina et al (2005) [61]	Myocardial infarction	1/58	0/79	4·07 (0·17–98·10)	0·6
Young et al (2014) [62]	Cardiac arrest	5/9	4/8	1·11 (0·45–2·75)	3·2
$p_{interaction}$=0·97					
In-hospital mortality, overall (I^2=0%, p=0·020)		283/7555	227/7516	1·21 (1·03–1·43)	100
30-day mortality, overall (I^2=0%, p=0·033)		484/7546	422/7507	1·14 (1·01–1·28)	100
Mortality at longest follow-up, overall (I^2=0%, p=0·044)		828/7897	749/7857	1·10 (1·00–1·20)	100

In-hospital Mortality:

RR 1.21

[1.03-1.43]

Chu et al, Lancet **2018**; 391:1693-705

- Use oxygen to correct hypoxemia,
- Don’t routinely* use oxygen to treat acute illness without hypoxemia.

Case 2

Mr. Feldzke is 59 year-old man with history of hypertension (on CCB and thiazide) who is hospitalized with CAP. He is doing well.

His 4 am blood pressure is 190 / 91. He has no new symptoms or concerns, except “what’s all this about?”

Nursing anxiously awaits your plan; the medicine shift coordinator is en route.

At what BP would you begin acute treatment?

- 160/90
- 170/95
- 180/100
- 190/105
- 200/110
- 210/115
- 220/120

We order as-needed and one time doses of antihypertensives to treat inpatient hypertensive “urgency”.

JOHNS HOPKINS MEDICINE

CHOOSING WISELY®: THINGS WE DO FOR NO REASON

Acute Treatment of Hypertensive Urgency

Anthony C. Breu, MD[1,2*], R. Neal Axon, MD, MSCR[3,4]

Breu and Axon, J Hosp Med 2018; 13(12):860-862

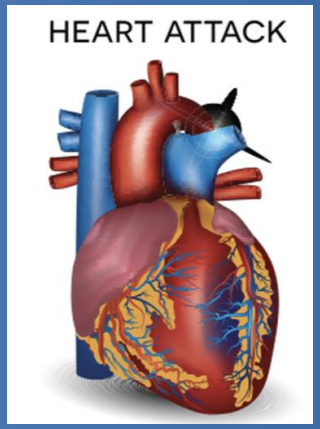
Hypertensive "urgency"

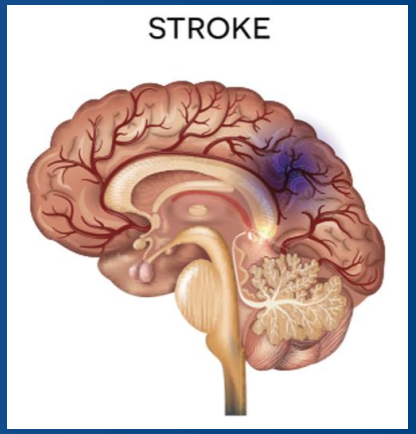
SBP ≥ 180 mmHg

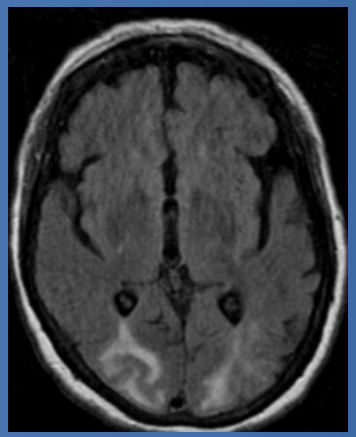
DBP ≥ 110 mmHg

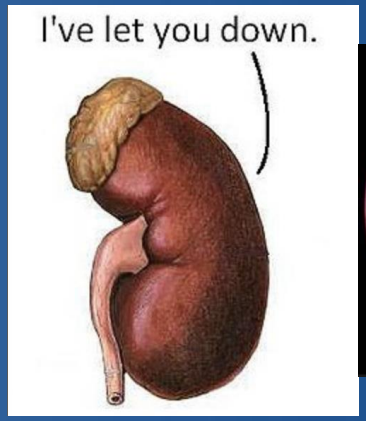
No s/sx of acute end organ damage

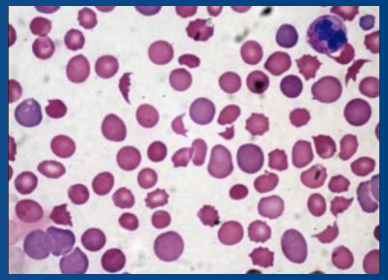
i.e., none of this stuff (acutely)



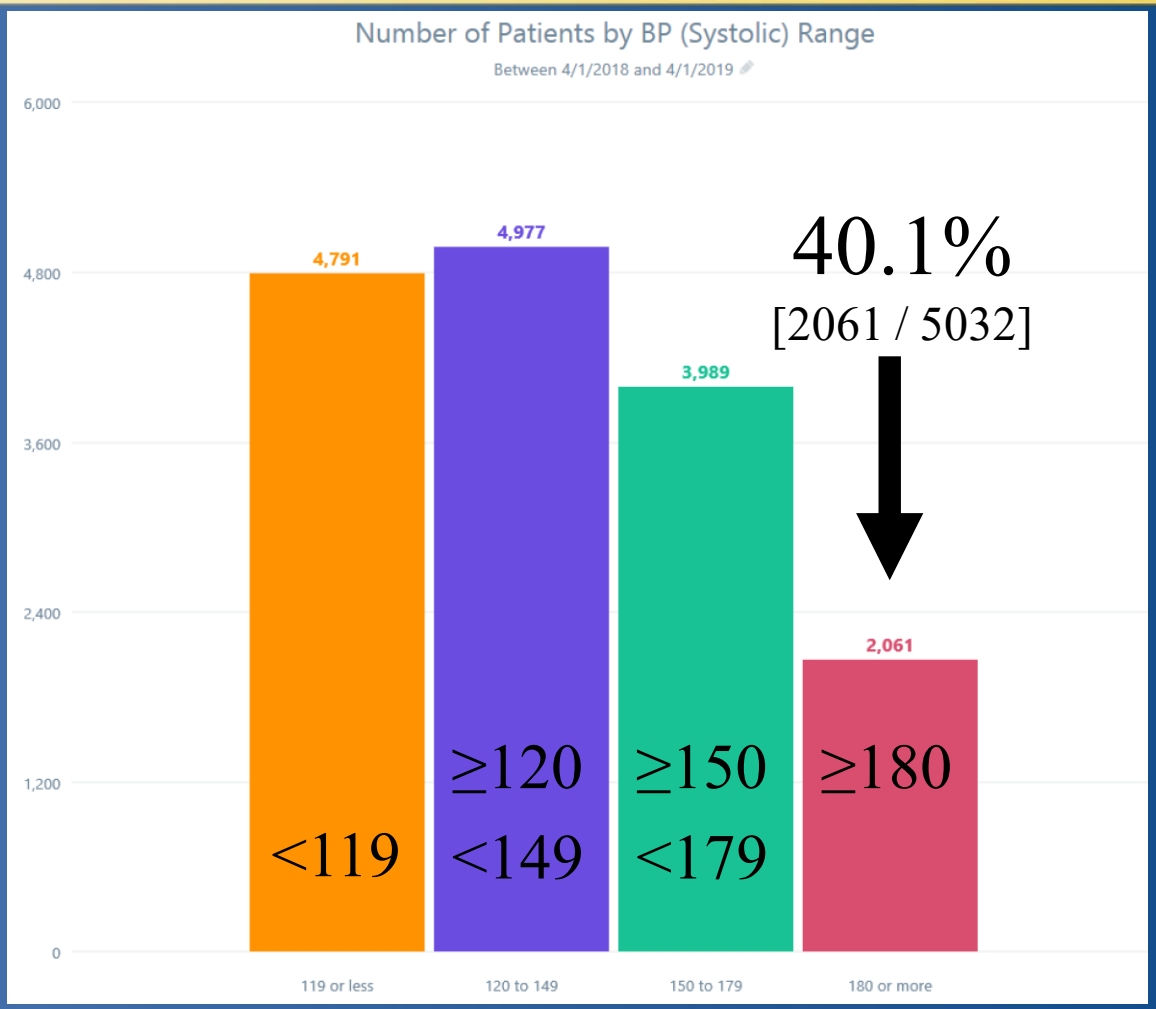




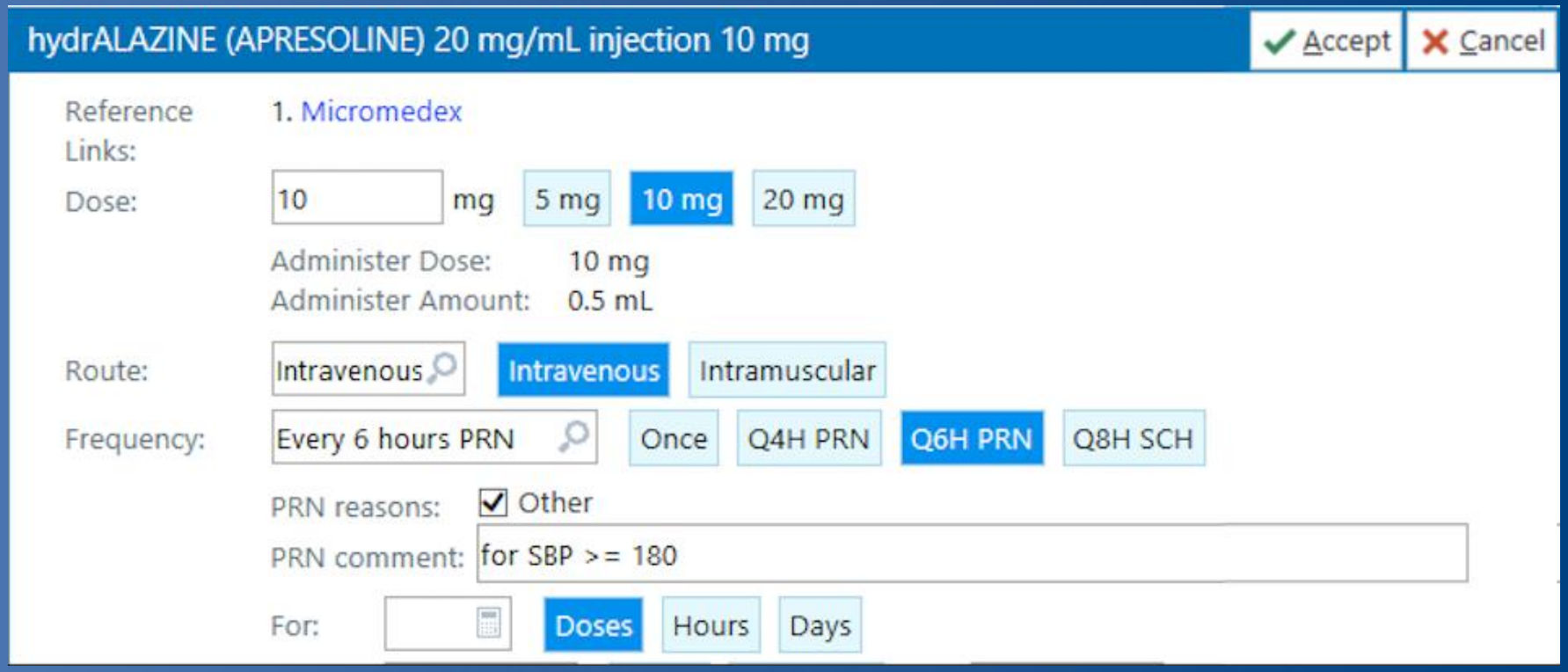


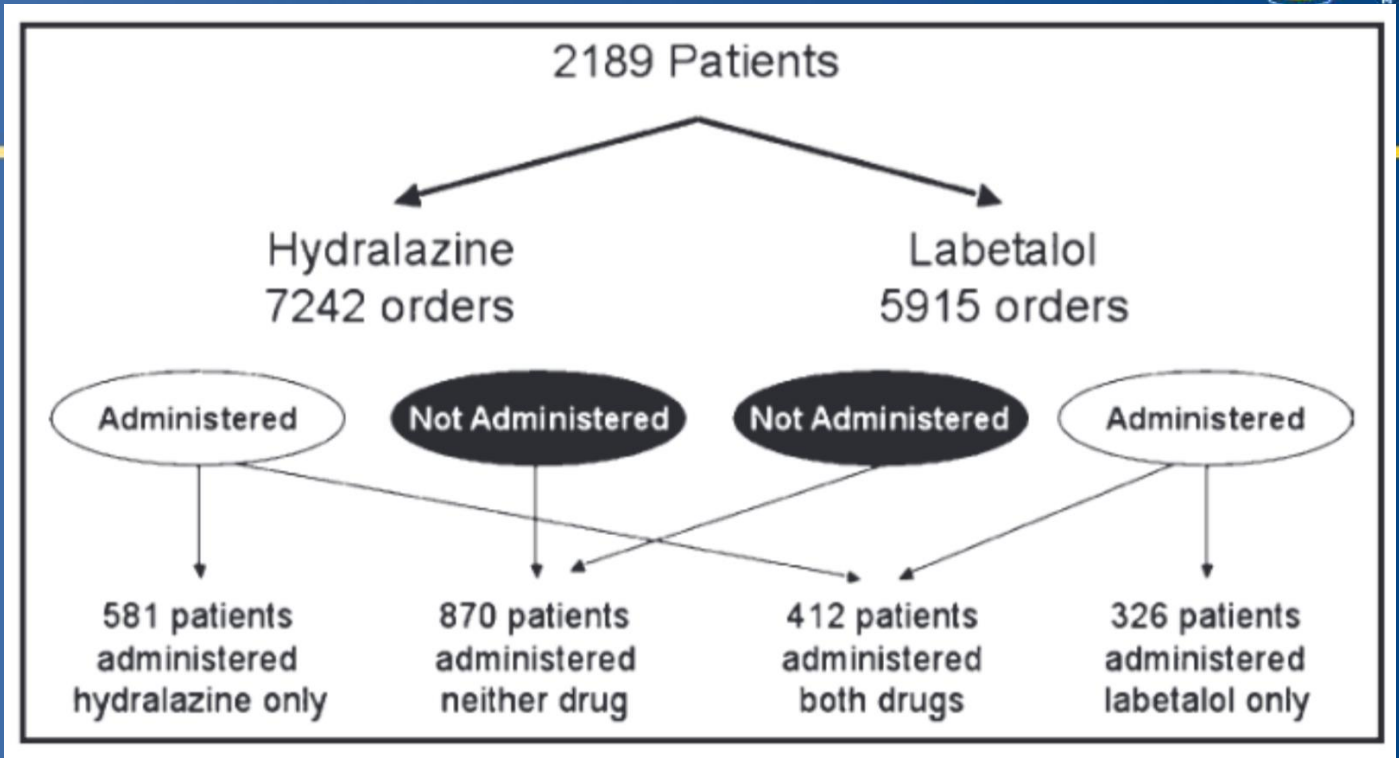


Elevated BP is very common in hospitalized adults.



A not uncommon approach:





7.4%

[2,189 out of 29,545 hospitalizations]

Large single center academic medical center.

Weder and Erickson,, J Clin Hypertens 2010:12(1): 29-33

Why do we do this?

- It's what I learned in residency / perceived standard of care
- HTN is a fixable risk factor for heart, brain and kidney disease.
- We assume that treatment now avoids imminent damage to end-organs.

Hypertensive “urgency”

(and the systems built around it)

tickles the amygdala

another reason….

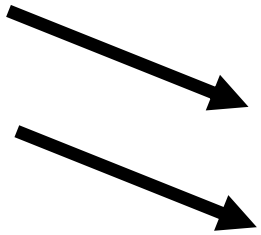
(we get paged about elevated BP)

Notify Prescriber/House Officer - Physiological Parameters

NHO:

SBP ≥ 180 mmHg

DBP ≥ 110 mmHg



Routine, Until discontinued,

Temperature greater than (C): 38.2
Heart rate less than (bmp): 50
Heart rate greater than (bmp): 120
Respiratory rate less than (rpm): 12
Respiratory rate greater than (rpm): 26
Systolic BP less than (mmHg): 90
Systolic BP greater than (mmHg): 180
Diastolic BP less than (mmHg): 50
Diastolic BP greater than (mmHg): 110
SaO2 less than: 92

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Table. Attitudes of UMHS Physicians Toward Transferring Patients to ICU for Acute Hypertension

Response	Physician Group	Percentage	Systolic BP (Mean±SD)	Diastolic BP (Mean±SD)
Yes	House officers	38%	210±18	117±13
	Hospitalists	32%	193±17	110±10
No	House officers	62%	. . .	. . .
	Hospitalists	68%	. . .	. . .

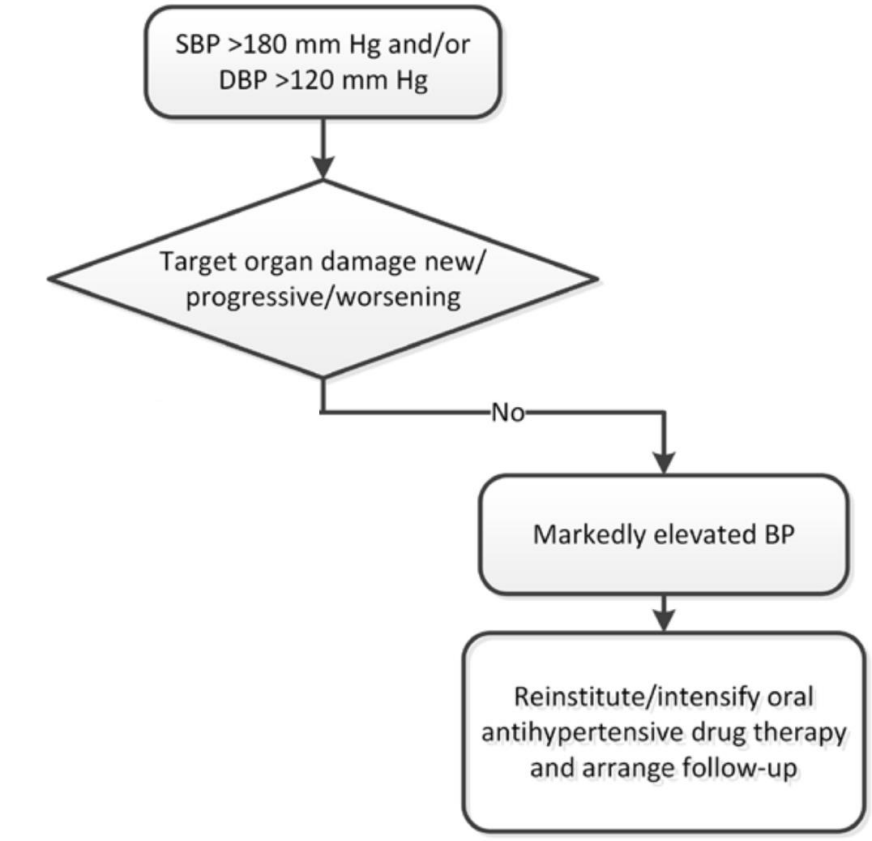
Responses of UMHS house officers (n=130) and hospitalists (n=31) to the questions: "Would you transfer an asymptomatic patient to an intensive care unit because of high BP even in the absence of target organ damage?" And "If 'yes,' what is the BP that would prompt the transfer?"

Weder et al Hypertension 2011; 57:18-20

Guidelines?

11.2. Hypertensive Crises—Emergencies and Urgencies

Recommendations for Hypertensive Crises and Emergencies



Whelton et al. Hypertension 2018; 71(6):e13

JNC 7 – COMPLETE VERSION

SEVENTH REPORT OF THE JOINT NATIONAL COMMITTEE ON PREVENTION, DETECTION, EVALUATION, AND TREATMENT OF HIGH BLOOD PRESSURE

"Unfortunately, the term "urgency" has led to overly aggressive management of many patients with severe, uncomplicated hypertension. Aggressive dosing with intravenous drugs or even oral agents to rapidly lower BP is not without risk."

Chobanian et al JNC-7. Hypertension 2003; 42(6):1206-52

Bad things DO happen to patients with uncontrolled hypertension.

This occurs on the time scale of months-to-years, not hours.

Effects of Treatment on Morbidity in Hypertension

Results in Patients With Diastolic Blood Pressures Averaging 115 Through 129 mm Hg

Veterans Administration Cooperative Study Group on Antihypertensive Agents

Double-blind placebo controlled RCT

- P: 143 adult men with clinic DBP 115-129 mmHg
- I: hctz + reserpine + hydralazine
- C: placebo
- O: severe complicating events*

*Death, stroke/bleed, CHF, MI, renal failure, retinopathy/papilledema, persistent ↑↑ DBP, treatment failure

JAMA. 1967;202(11):1028-34

	Treatment (n=73)	Placebo (n=70)
Primary outcome*	2 (2.7%)	27 (38.5%)
Death/Stroke/CHF/AMI	1 (1.3%)	14 (20%)
Death	0 (0%)	4 (5.7%)
Stroke/TIA	1 (1.3%)	4 (5.7%)
CHF	0 (0%)	4 (5.7%)
AMI	0 (0%)	2 (2.8%)

Time to First Events:

1-2 months

Average time to event:

11 months

JAMA. 1967;202(11):1028-34

Original Investigation

Characteristics and Outcomes of Patients Presenting With Hypertensive Urgency in the Office Setting

Krishna K. Patel, MD; Laura Young, MD; Erik H. Howell, MD; Bo Hu, PhD; Gregory Rutecki, MD; George Thomas, MD; Michael B. Rothberg, MD, MPH

R-cohort w/ propensity matching

- Who: 59,836 non-pregnant adults;
  SBP ≥180 and/or DBP ≥110mmHg
- What: stroke/TIA, heart attack
- If: sent to hospital versus home

Patel et al., JAMA Intern Med. 2016;176(7):981-988

Nearly all do fine in near term (unadjusted analysis)

182.5 / 96.4

(mean BP)

MACE	Referred to Hospital (n=426)	Sent Home from Clinic (n=58,109)	P
@ 7d	2 (0.5)	61 (0.1)	0.02
@ 8-30d	2 (0.5)	119 (0.2)	0.23
@ 1-6mo	4 (0.9)	492 (0.8)	0.83

Patel et al., JAMA Intern Med. 2016;176(7):981-988

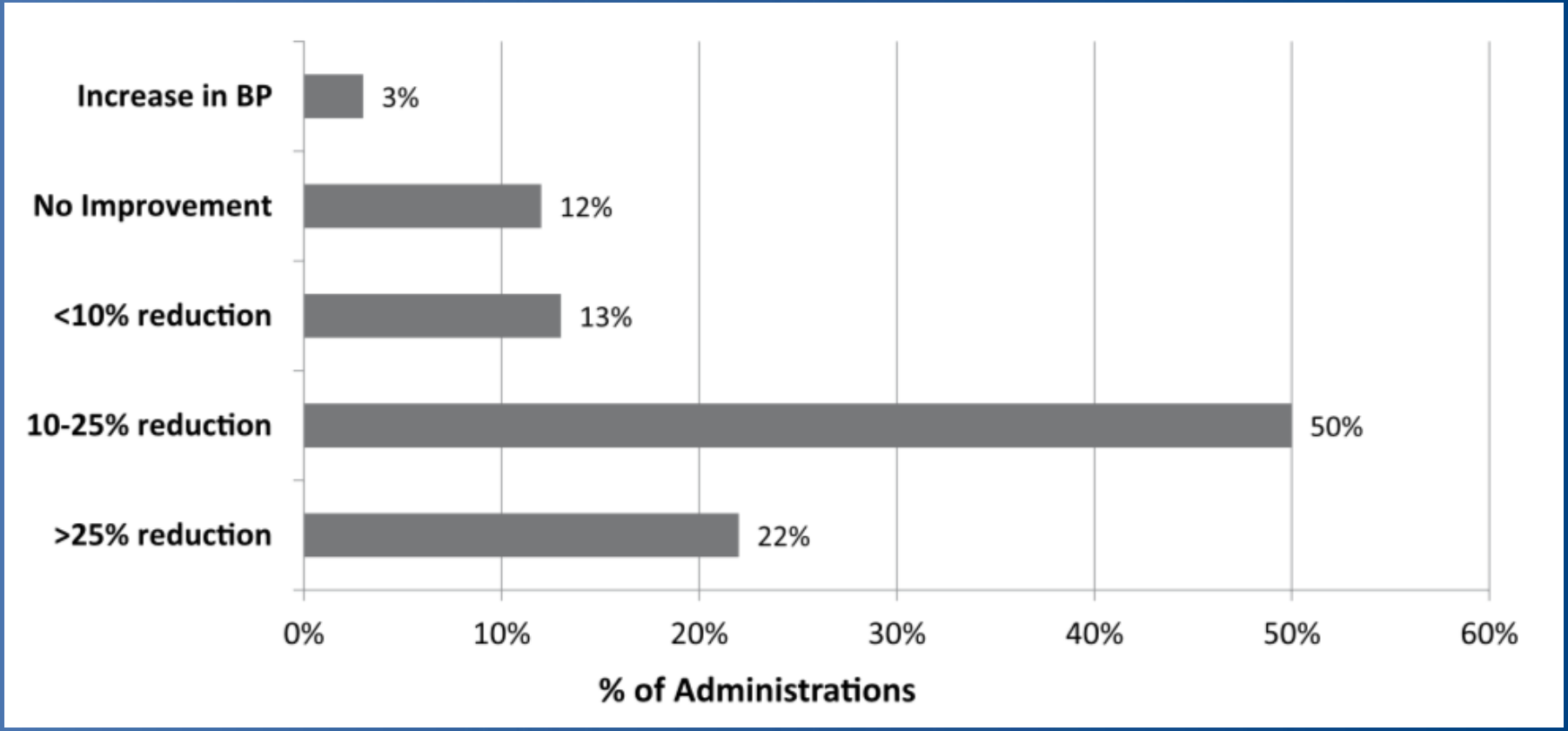
Even with really high SBP.

7-d MACE	Referred	Sent Home	P
≥200 mmHg	0 / 218 (0%)	13 / 5745 (0.2%)	1.00
≥220 mmHg	0 / 81 (0%)	2 / 977 (0.2%)	0.23

Patel et al., JAMA Intern Med. 2016;176(7):981-988

Aggressive drug therapy frequently lowers blood pressure more than is intended.

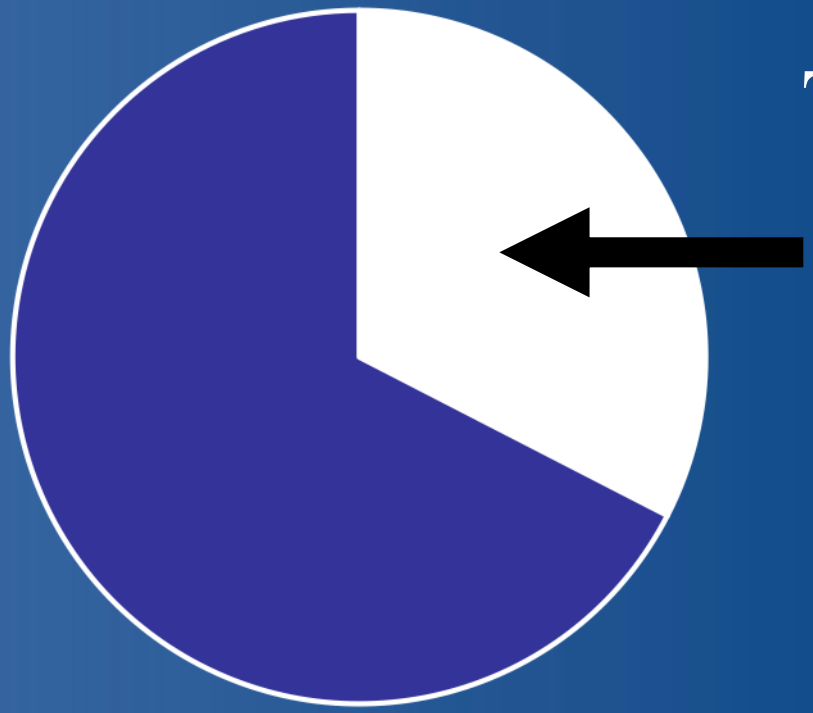
Overshoot is common.



Gaynor et al., Ther Adv Card Dis. 2017:12(1): 7-15

BP falls more than is intended or desired

↓ BP > 25% within 6 hours



Too fast!

56 of 172

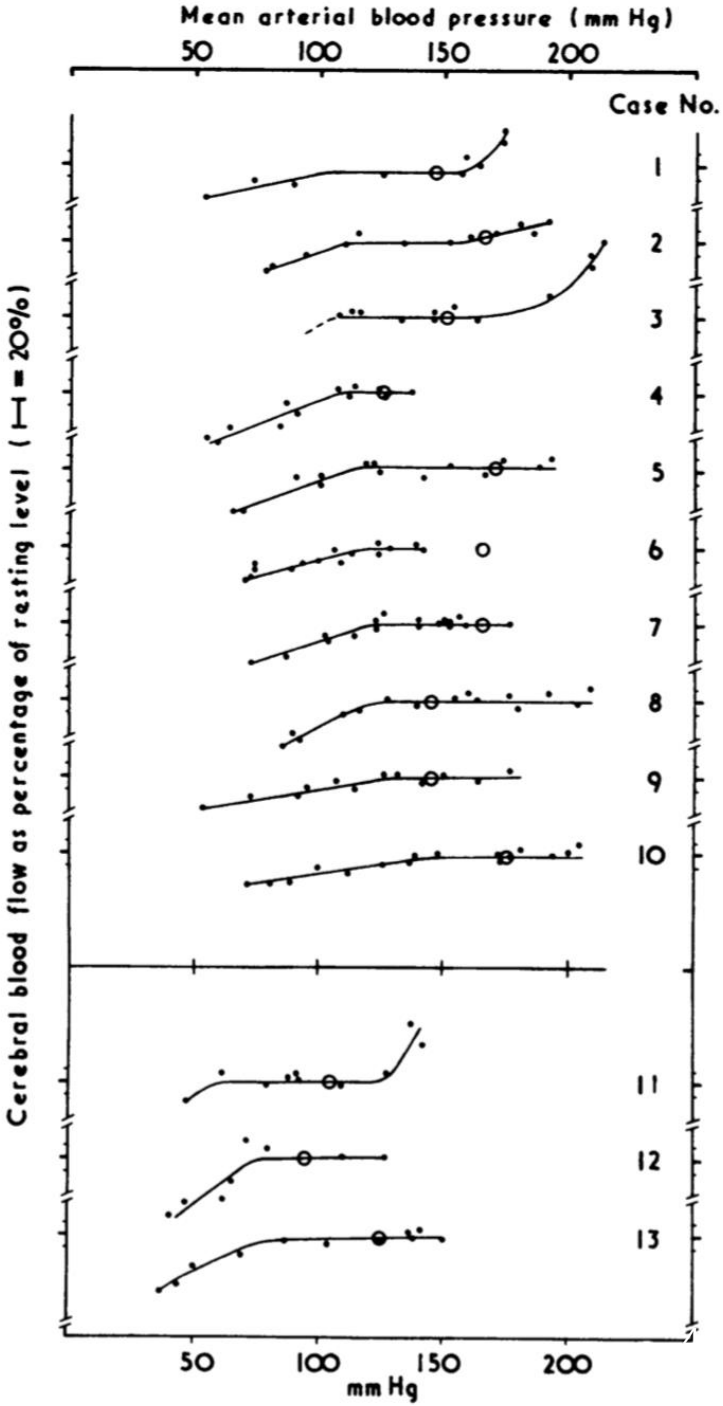
33%

Lipari et al., J Hosp Med 2016:11(3): 193-198

Autoregulation of blood flow in important vascular beds is “right shifted”

Acutely lowering MAP can compromise blood flow to the brain,

(or heart or kidney)



Strangaard et al, BMJ 1973;1 507-510

JOHNS HOPKINS MEDICINE

The Journal of Emergency Medicine

AAEM AMERICAN ACADEMY OF EMERGENCY MEDICINE
CHAMPION OF THE EMERGENCY PHYSICIAN

Stroke precipitated by moderate blood pressure reduction

Glenn M. Fischberg, MD[a], Edward Lozano, MD[a], Kumar Rajamani, MD[a], Sebastian Ameriso, MD[a], Mark J. Fisher, MD[a,*]

Teachable Moment | Less Is More

May 2018

Overtreatment of Asymptomatic Hypertension—Urgency Is Not an Emergency

A Teachable Moment

Fischberg et al. J Emerg Med. 2000;19(4):339-46
Yang et al., JAMA Intern Med. 2018;178(5):704-705

There are other things we can do:

Rest

Remeasure

Reassess

Restart

(Ramp up)

Return for follow-up

Rest with or without drug therapy may effectively lower BP.

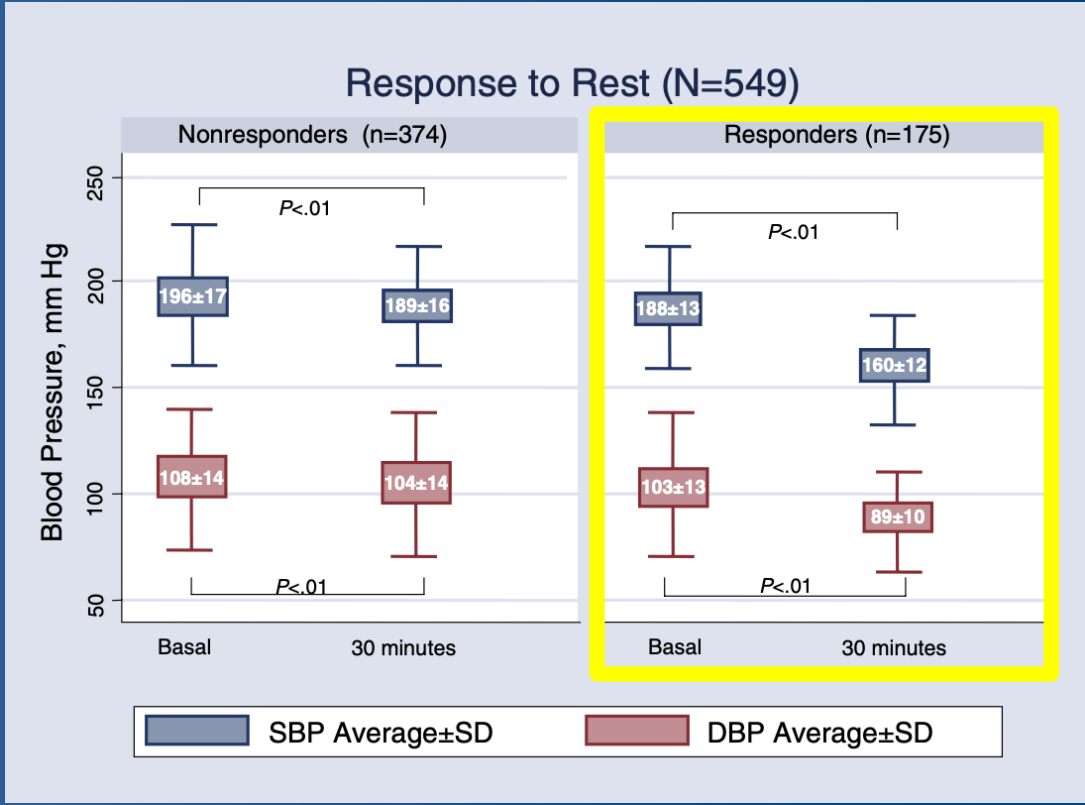
Park et al., J Hypertens 2017; 35(7)-1474-1480
Grossi et al., J Clin Hypertens. 2008; 10(9):662-7
Acta Med Scand 1980; 208:473-480

Hypertensive Urgencies in the Emergency Department: Evaluating Blood Pressure Response to Rest and to Antihypertensive Drugs With Different Profiles

Rest alone

31.9%

satisfactory reduction in BP



Grassi et al J Clin Hypertens. 2008; 10:662-7

Original Article

Comparing the clinical efficacy of resting and antihypertensive medication in patients of hypertensive urgency: a randomized, control trial

Open-label RCT

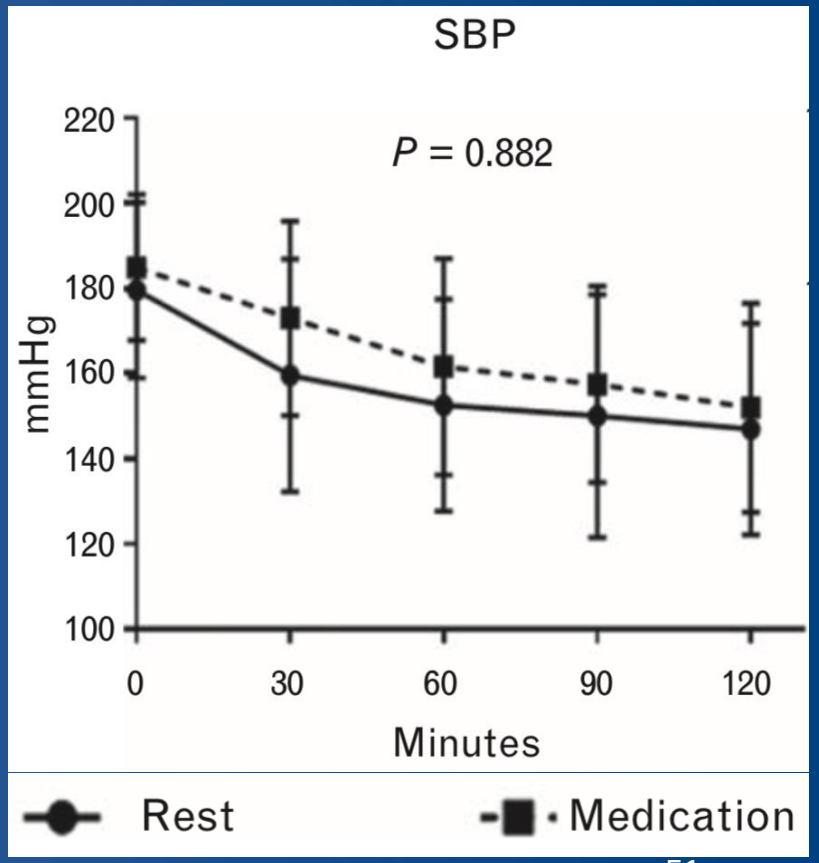
P: 138 adults w/ SBP ≥180 and/or DBP ≥110 mmHg

I: rest

C: telmisartan

O: 10-35% ↓ MBP @ 2h

68.5% v 69.1%



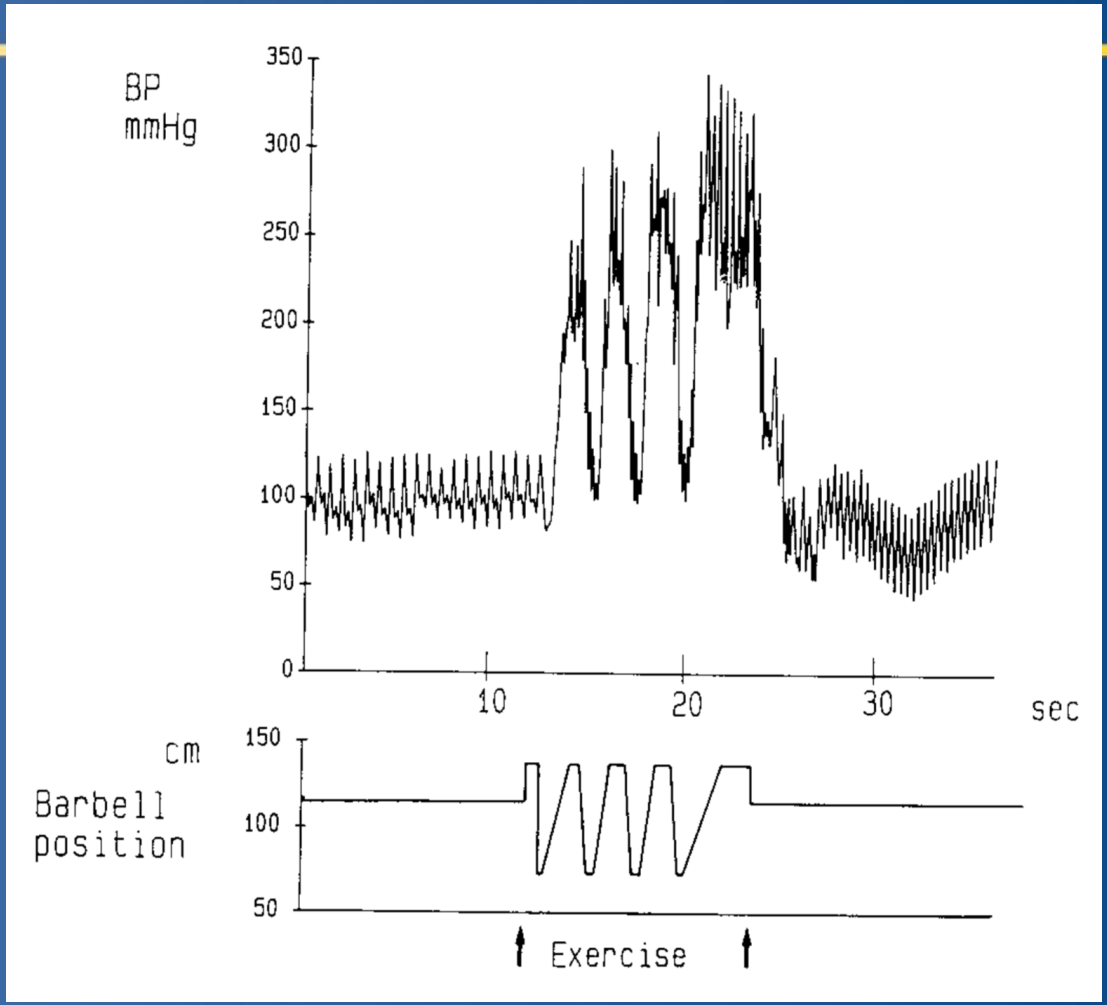
Park et al., J Hypertens 2017; 35(7)-1474-1480

Re-measure

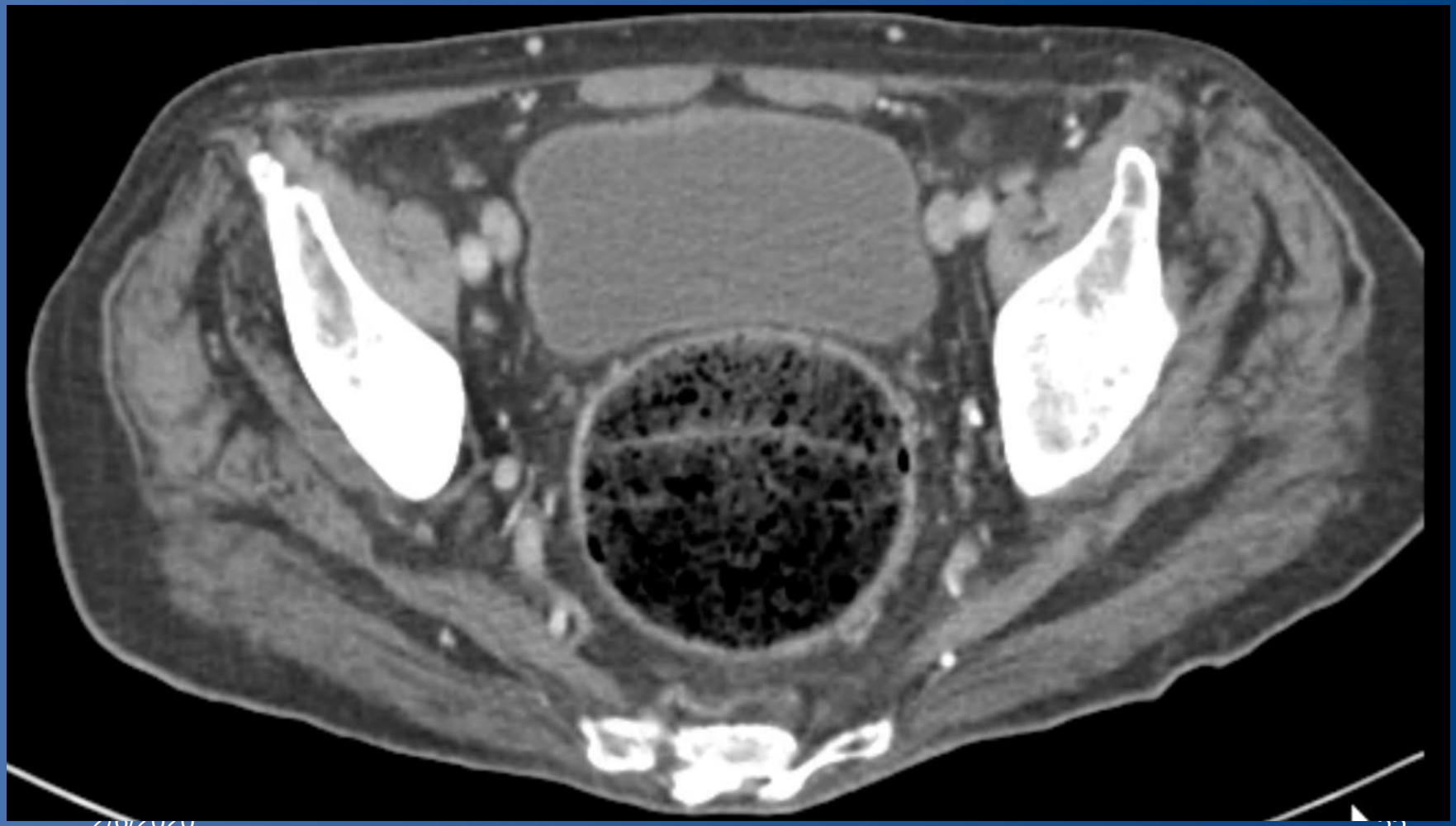
Blood pressure measurement technique is imperfect

Reassess

Seek and mitigate treatable causes of reactive hypertension


BP
mmHg
350
300
250
200
150
100
50
0
10
20
30
sec
cm
150
100
50
Barbell
position
Exercise

No antihypertensives can fix this stubborn cause of ↑ BP



Restart

Home antihypertensives are often held or delayed.

60%

Gaynor et al., Ther Adv Card Dis. 2017:12(1): 7-15

JAMA Internal Medicine | Original Investigation

Clinical Outcomes After Intensifying Antihypertensive Medication Regimens Among Older Adults at Hospital Discharge

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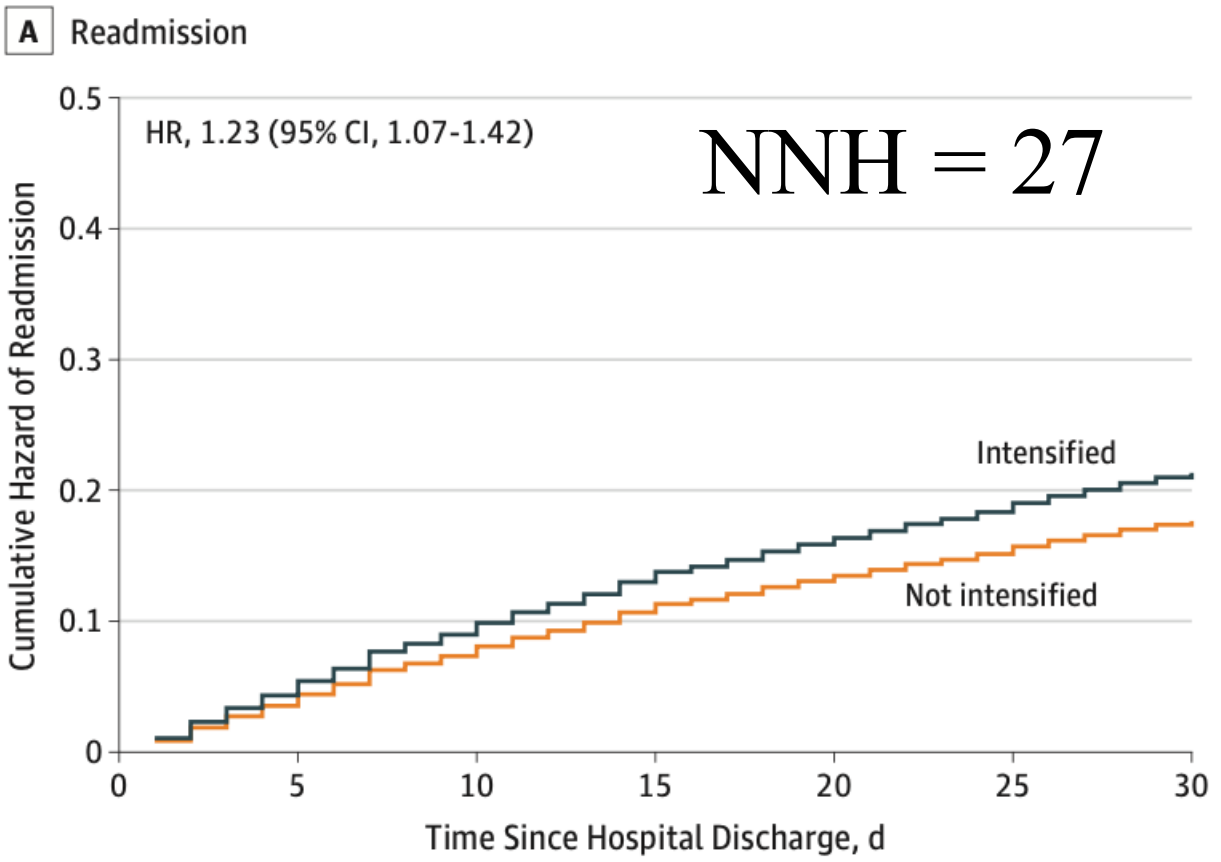
R-cohort w/ propensity matching

- Who: 4,056 adults > 65y w/ HTN hospitalized with non-cardiac conditions from 2011-2013
- What: hospital readmission, 30-d serious adverse events and 1-y CV events
- If: ↑ BP meds @ DC

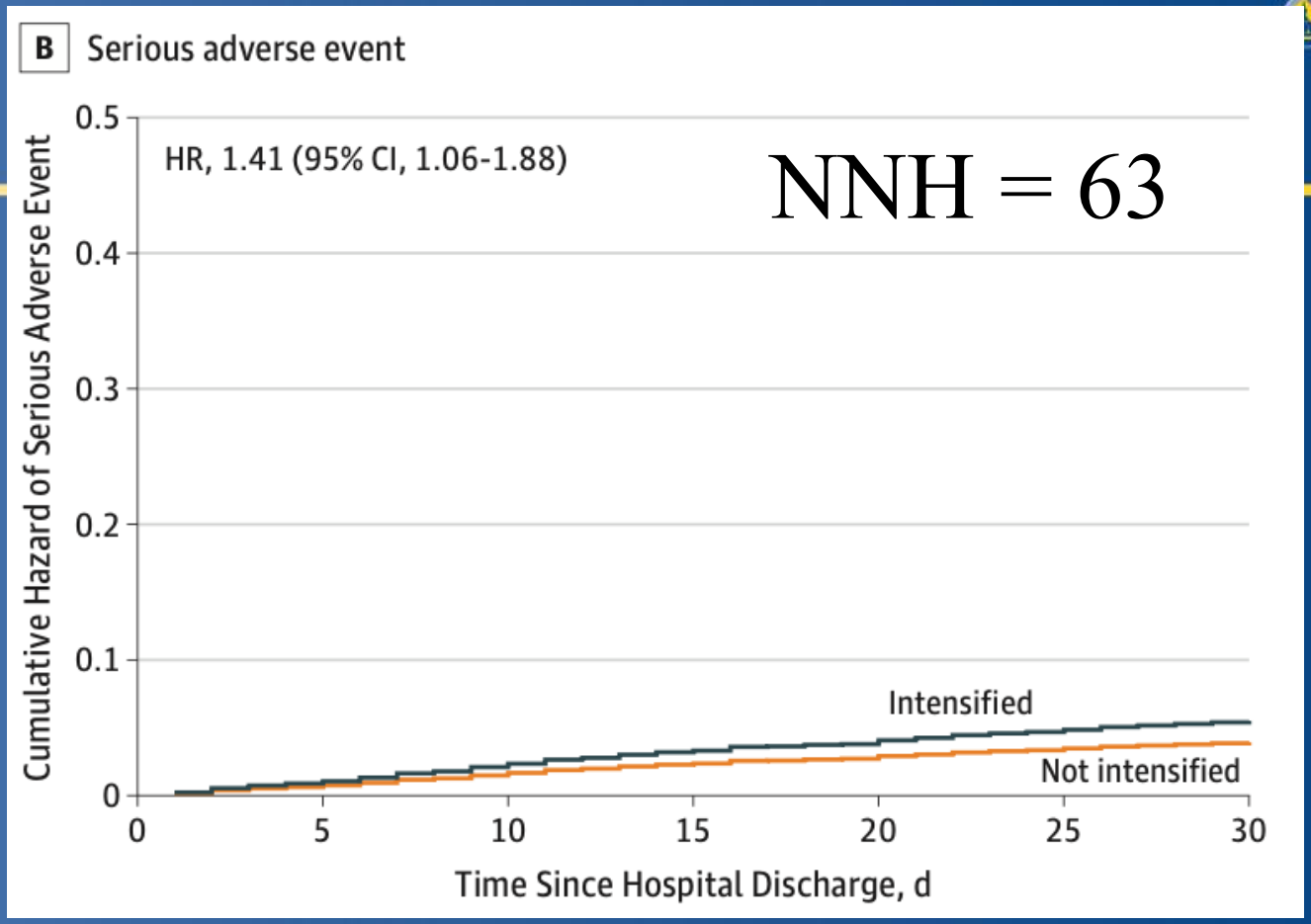
Anderson et al JAMA IM 2019; 10.1001/jamainternmed.2019.3007

Figure. Cumulative Hazard Plots Comparing Outcomes With Exposure to Antihypertensive Regimen Intensifications at Hospital Discharge



30-d readmission

21.4% versus 17.7%



30-d serious adverse events

4.5% versus 3.1%

Change is possible

Assess Before Rx: Reducing the Overtreatment of Asymptomatic Blood Pressure Elevation in the Inpatient Setting

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	Pre	Post
Inappropriate Orders per 1000 p-d	8.3	3.3
Adverse events due to inappropriate orders Per 1000 p-d	3.7	0.8

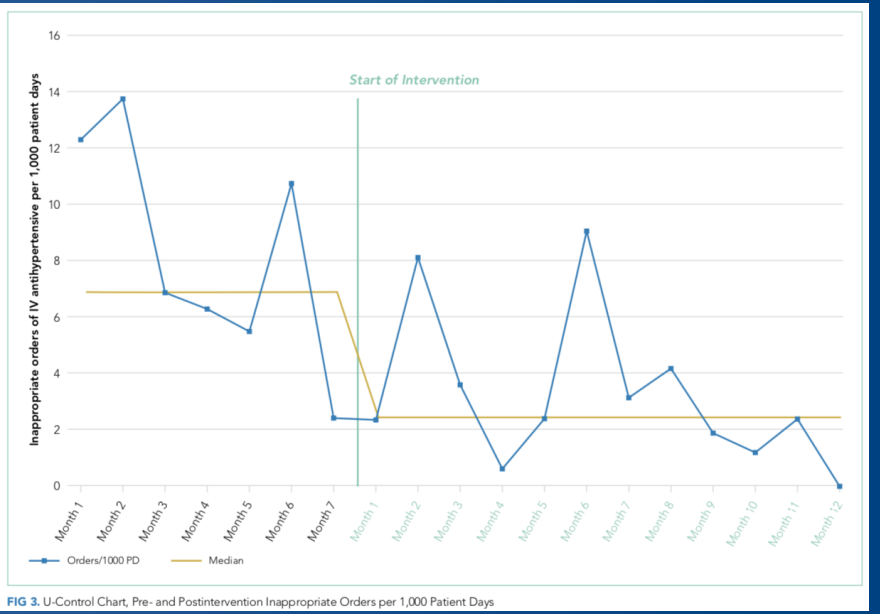

FIG 3. U-Control Chart, Pre- and Postintervention Inappropriate Orders per 1,000 Patient Days

Recap

1. Join the discussion @TWDFNR

2. Don’t use oxygen to treat acute illness without hypoxemia.

3. Avoid PRN anti-hypertensives for blood pressure management