

Addressing Hypertension Management Protocols at Axim Government & Apam District Hospitals

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Study Aims

- The aims of this project are to:
 1. Explore the knowledge base of hypertension management amongst hospital staff at Axim Government Hospital and Apam District Hospital
 2. Highlight situations where IV Lasix would resolve in morbidity especially in the setting of acute renal failure
 3. Suggest an alternative approach to the current hypertensive protocol
 4. Facilitate educational exercises with local health care professionals to implement a safer approach to the management of chronic hypertension and hypertensive urgencies/emergencies.

Hypertension Statistics

Axim Government Hospital annual PERFORMANCE REPORT 2013

TOP 10 OPD CASES

DISEASES 2011)	TOTAL	%	DISEASES 2012	TOTAL	%	DISEASES 2013)	TOTAL	%
Malaria	27117	24.21	Malaria	30421	49.56	Malaria	19623	28.19
ARI	5263	4.69	Preg & Rel Comp	2918	4.75	ARI	2243	3.22
Preg. & Rel. Comp	2009	1.79	ARI	2824	4.60	Preg. & Related Comp	1207	1.73
Gynaecological	857	0.76	Skin Dis & Ulcer	482	0.79	Enteric Fever	278	0.40
UTI	787	0.70	Intestine Worm	433	0.70	Anaemia	223	0.32
Intestinal Worm	401	0.35	Diarrheal Dis	357	0.58	Hypertension	167	0.27
Hypertension	239	0.21	Rheumatism and Joint Pain	302	0.49	Diabetes Mellitus	158	0.23
Enteric Fever	200	0.18	Gynaecological	285	0.43	Intestinal Worm	152	0.22
Diabetes Mellitus	185	0.16	Anaemia	217	0.35	UTI	119	0.17
Skin Disease	179	0.15	Hypertension	142	0.23	Gynaecological	118	0.16
All Other Disease	75258	67.01	All Other Disease	23018	37.50	All Other Disease	45436	65.28

Hypertension Statistics: Axim

TOP 10 CAUSES OF ADMISSIONS

DISEASE (2011)	TOTAL	%	DISEASE (2012)	TOTAL	%	DISEASE (2013)	TOTAL	%
Malaria	1652	33.56	Malaria	1538	31.48	Malaria	1463	22.77
Gastroenteritis	1121	22.78	Gastroenteritis	1203	24.62	Gastroenteritis	1058	18.73
ARI	821	16.68	ARI	615	12.59	ARI	781	13.78
Anaemia	415	8.43	Anaemia	406	8.31	Enteric Fever	306	5.39
Hypertension	136	2.76	Enteric Fever	317	6.49	Hypoglycaemia	92	1.62
R.T.A	109	2.21	R.T.A	100	2.05	R.T.A	88	1.55
Cellulitis	97	1.97	Hypertension	98	2.01	Hypertension	76	1.34
Asthma	70	1.42	Parasitic Disease	57	1.17	Asthma	46	0.82
Enteric Fever	46	0.93	Cellulitis	40	0.81	Cellulitis	36	0.63
Parasitic Diseases	23	0.47	Asthma	19	0.30	Anaemia	33	0.58
All Other Disease	433	8.80	All Other Disease	1751	28.49	All Other Disease	1698	29.91

TOP 10 CAUSES OF DEATH

DISEASES (2012)	TOTAL	%	DISEASES (2013)	TOTAL	%
Malaria	35	25.93	Malaria	29	17.47
CVA	15	11.11	Anaemia	13	11.21
Anaemia	11	8.15	CVA	9	7.76
Gastroenteritis	8	5.9	Gastroenteritis	9	7.76
Septicaemia	8	5.9	HIV/AIDS Complication	7	6.03
HIV/AIDS Complication	7	5.1	Septicaemia	5	4.31
Acute Abdominal Pain	5	3.7	Hypoglycaemia	5	4.31
Hypoglycaemia	4	2.9	Sudden Collapse	4	3.45
Cellulitis	4	2.9	Chest Infection	3	2.57
Chest Infection	4	2.9	Acute Abdominal Pain	3	2.57
All Other Disease	34	25.19	All Other Diseases	29	25.00

Hypertension Statistics: Apam

HYPERTENSION CASES 2013 Apam

MONTHS	OPD		DEATH	ADMISSIONS		
	MALE	FEMALE		FEMALE	MAT.	MALE
JAN.	27	68	1	9	3	4
FEB.	24	69	1	6	2	5
MAR.	22	82	2	8	1	1
APR.	12	47	—	9	5	3
MAY	23	57	1	13	1	3
JUN.	15	69	2	4	3	4
JUL.	22	71	2	16	1	3
AUG.	20	43	—	8	—	9
SEPT.	18	53	—	14	5	2
OCT.	29	69	1	13	2	—
Nov.	19	36	2	3	6	3
DEC.	10	28	—	8	4	3
Total	241	612	12	111	33	40
		933				184

Standard Treatment Guidelines

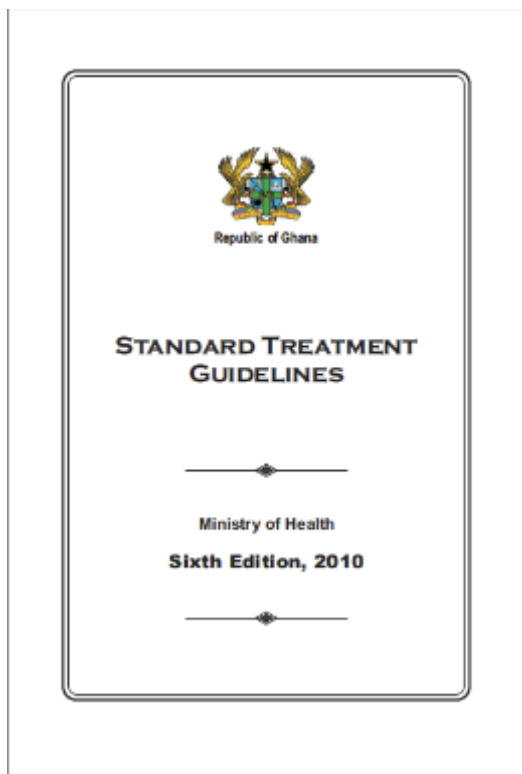


Table 8-1 (Continued): Antihypertensive Treatment by Drug Class

Calcium channel blockers Nifedipine retard, oral, 10-40 mg 12 hourly	<ul style="list-style-type: none"> Particularly useful in isolated systolic hypertension Short acting formulations should not be
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Table 8-1: Antihypertensive Treatment by Drug Class	
Antihypertensive Class	Comments
Thiazide diuretics Bendroflumethiazide (bendroflumazide), oral, 2.5 mg daily	<ul style="list-style-type: none"> Use with caution in gout, diabetes mellitus and dyslipidaemia Enhances effectiveness of other classes of antihypertensives when used in combination
Beta-blockers Atenolol, oral, 50 -100 mg daily Or Bisoprolol, oral 5-20 mg daily Or Carvedilol, oral, 6.25-25 mg 12 hourly	<ul style="list-style-type: none"> Useful in angina and post myocardial infarction (when not contraindicated) Avoid in asthma, chronic obstructive pulmonary disease and heart block
Angiotensin-converting enzyme (ACE) inhibitors Lisinopril, oral, 5-40 mg daily Or Ramipril, oral, 2.5-10 mg daily	<ul style="list-style-type: none"> Avoid in pregnancy and renovascular diseases Can be used in heart failure, diabetes nephropathy and left ventricular dysfunction Commonest side effect is dry persistent cough Monitor serum potassium level periodically
Angiotensin receptor blockers Losartan, oral, 25-100 mg daily Or Candesartan, oral, 4-32 mg daily Or Valsartan, oral, 80-160 mg daily	<ul style="list-style-type: none"> Useful alternative to ACE inhibitors when dry persistent cough is a problem Monitor serum potassium level periodically

Vasodilators
 Hydralazine
Adults
 Oral, 25-50 mg
 Slow IV injection
 5-10 mg dilute
 Repeat after 20

Standard Treatment Guidelines

40. HYPERTENSIVE EMERGENCIES

Severe hypertension, usually BP>180/120 mmHg in adults and lower levels in children, may be associated with acute neurological, cardiovascular or renal compromise, and could be fatal.

Hypertensive emergencies include:

- Hypertensive encephalopathy
- Left ventricular failure associated with severe hypertension
- Hypertension and dissection of aorta
- Hypertension with myocardial infarction

103

DISORDERS OF THE CARDIOVASCULAR SYSTEM

- Acute glomerulonephritis with severe hypertension.
- Eclampsia (in pregnant women)

Rapid correction of blood pressure with careful monitoring to avoid a precipitous drop is indicated in these circumstances.

TREATMENT

Treatment objectives

- To limit further organ-related complications by controlled reduction of BP
- To return diastolic blood pressure to <110 mmHg within 1 hour (within 10 minutes for dissecting aneurysm)

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Treatment objectives

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Non-pharmacological treatment

- Strict bed rest

Pharmacological treatment

(Evidence rating: A)

- Hydralazine, IV,

Adults

5-10 mg slowly over 20 minutes. This dose may be repeated after 20-30 minutes, until the patient is conscious and can take oral medications

Children

12-18 years;

5-10 mg 12 hourly repeated every 4-6 hours as necessary

1 month - 12 years;

100-500 microgram/kg repeated every 4-6 hours as necessary; maximum 3 mg/kg daily (not exceeding 60 mg)

<1 month;

100-500 microgram/kg repeated every 4-6 hours as necessary; maximum 3 mg/kg daily

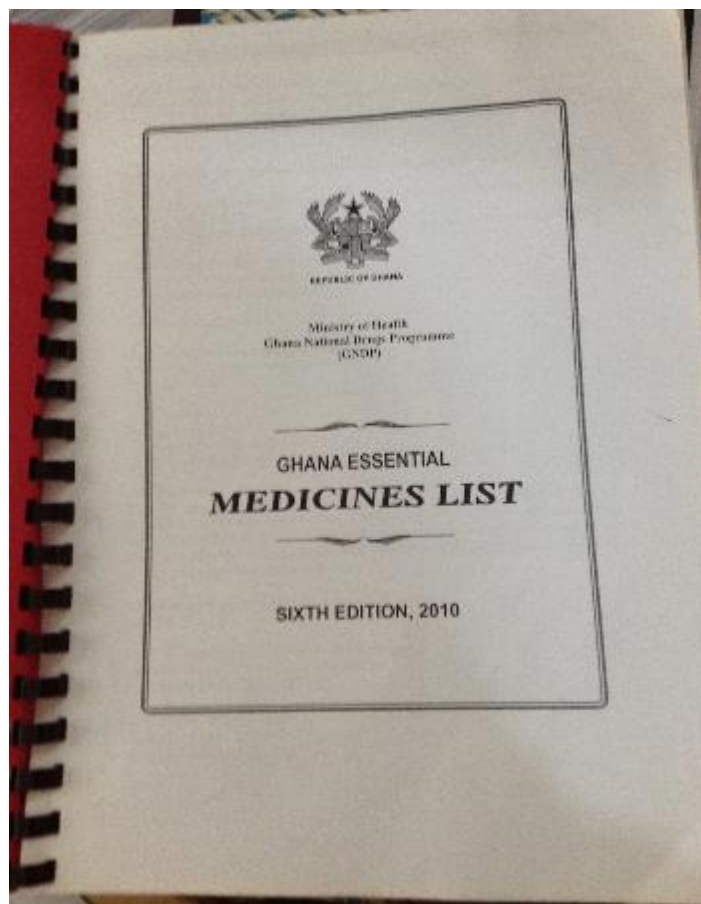
Or

Labetalol, IV,

Adults

50 mg over 1 minute repeated after 5 minutes if necessary to a maximum of 200 mg

Approved Antihypertensive Medications



Ghana Essential Medicines List
EML 2010

THERAPEUTIC CLASS	NAME OF DRUG, DOSAGE FORM AND STRENGTH	LEVEL OF CARE	NHIA STATUS	CODE
	Bisoprolol Tablet, 5 mg	D	NR	BISOPR1A1
	Bisoprolol Tablet, 10 mg	D	NR	BISOPR1A2
	Candesartan Tablet, 8 mg	D	NR	CANDES1A1
	Candesartan Tablet, 16 mg	D	NR	CANDES1A2
	Dobutamine Injection, 12.5 mg/ml	C	NR	DOBU1A/11
	Hydralazine Injection, 20 mg	C	R	HYDRAL1M1
	Hydralazine Tablet, 25 mg	C	R	HYDRAL1M2
	Labetalol Injection, 5 mg/ml	D	R	LABETA1N1
	Losartan Tablet, 25 mg	D	R	LOSART1A1
	Losartan Tablet, 50 mg	D	R	LOSART1A2
	Losartan Tablet, 100 mg	D	R	LOSART1A3
	Methyldopa Tablet, 250 mg	B2	R	METHY1D1A1
	Nifedipine Capsule, 5 mg	D	R	NIFED1C1A1
	Nifedipine Capsule, 10 mg	D	R	NIFED1C1A2
	Nifedipine Tablet, 10 mg (Slow-Release)	B2	R	NIFED1C1A3
	Nifedipine Tablet, 20 mg (Slow-Release)	B2	R	NIFED1C1A4
	Nifedipine Tablet, 30 mg (Slow-Release)	B2	R	NIFED1C1A5
	Propranolol Tablet, 500 microgram	D	R	PROPR1A1
	Propranolol Injection, 1 mg/ml	D	R	PROPR1A2
	Propranolol Tablet, 10 mg	B2	R	PROPR1A3
	Propranolol Tablet, 40 mg	B2	R	PROPR1A4
	Propranolol Tablet, 80 mg	B2	R	PROPR1A5
	Ramipril Tablet, 2.5 mg	C	R	RAMP1R1A1
13.4 CARDIAC GLYCOSIDES				
	Digoxin Elixir, 500 microgram/ml	C	R	DIGOX1E1
	Digoxin Tablet, 125 microgram	C	R	DIGOX1T1
	Digoxin Tablet, 250 microgram	C	R	DIGOX1T2
13.5 LIPID-REGULATING DRUGS				
	Atorvastatin Tablet, 10 mg	C	R	ATOR1A1
	Atorvastatin Tablet, 20 mg	C	R	ATOR1A2
	Ezetimibe Tablet, 10 mg	D	R	EZET1M1
	Ezetimibe Tablet, 20 mg	D	R	EZET1M2
	Rosuvastatin Tablet, 5 mg	D	R	ROSU1A1
	Rosuvastatin Tablet, 10 mg	C	R	ROSU1A2
	Rosuvastatin Tablet, 20 mg	C	R	ROSU1A3

Approved Antihypertensive Medications

13.3 ANTIHYPERTENSIVE DRUGS	B2	R	PNOPRATA3
Amlodipine Tablet, 5 mg	B2	R	AMLODITA1
Amlodipine Tablet, 10 mg	B2	R	AMLODITA2
Atenolol + Hydrochlorothiazide Tablet, (100 mg + 25 mg)	B2	R	ATEHYDITA2
Atenolol + Hydrochlorothiazide Tablet, (50 mg + 25 mg)	B2	R	ATEHYDITA1
Atenolol Injection, 500 microgram/ml	D	R	ATENOLIN1
Atenolol Tablet, 100 mg	C	R	ATENOLTA3
Atenolol Tablet, 25 mg	B2	R	ATENOLTA1
Atenolol Tablet, 50 mg	B2	R	ATENOLTA2
Bendroflumethiazide Tablet, 2.5 mg	B2	R	BENDROTA1
Bendroflumethiazide Tablet, 5 mg	B2	R	BENDROTA2

Level A	- Community
Level M	- Midwifery
Level B1	- Health Centre without Doctor
Level B2	- Health Centre with Doctor
Level C	- District Hospital
Level D	- Regional/Teaching Hospital
Level SD	- Specialist Drugs
Level PD	- Programme Drugs

Ghana Essential Medicines List EML 2010

THERAPEUTIC CLASS	NAME OF DRUG, DOSAGE FORM AND STRENGTH	LEVEL OF CARE	NHIA STATUS	CODE
17. DIURETICS				
	Bendroflumethiazide Tablet, 2.5 mg	B2	R	BENDROTA1
	Bendroflumethiazide Tablet, 5 mg	B2	R	BENDROTA2
	Furosemide Injection, 10 mg/ml	D2	R	FUROSEIN1
	Furosemide Tablet, 40 mg	B2	R	FUROSETA1
	Mannitol Injection, 10 %	C	R	MANNITIN1
	Mannitol Injection, 20 %	C	R	MANNITIN2
	Metolazone Tablet, 5 mg	D	R	METOLATA1
	Spironolactone Tablet, 25 mg	C	R	SPIRONTA1
	Spironolactone Tablet, 50 mg	C	R	SPIRONTA2

Methods

- On April 7, 2014 an hour and a half lecture training session was given
 - Attended by 36 health care professionals including nurses, midwives, PA's, and local physicians
 - A 10 question pretest and post test was given
 - Employees were instructed to read up on hypertension
 - Due to time constraints, the 1 week followup post-test was unable to be administered



Methods

- On April 23, 2014 an hour workshop was held
 - Attended by 29 health care professionals including nurses, midwives, PA's, and local physicians
 - A 10 question pretest and post test was given
 - Answers to the post-test were reviewed following the lecture
 - The following week, the same test was given to assess knowledge retention rates
 - Due to holidays and varying work schedules, only 10 exams were administered



Methods

- ▣ Lecture Objectives
 - ▣ Review basic cardiac physiology and hypertension definitions
 - ▣ 4 objectives of managing high blood pressure
 - ▣ Stratify patients into 4 treatment categories based on their blood pressure and risk factors
 - ▣ Describe elements of lifestyle modification (including health education and behavioral change strategies)
 - ▣ Formulate basic management plans for the longitudinal care of patients with HPT
 - ▣ Highlight the most common hypertensive emergencies where emergent blood pressure reduction is warranted

Lecture Footage



Results

■ Axim

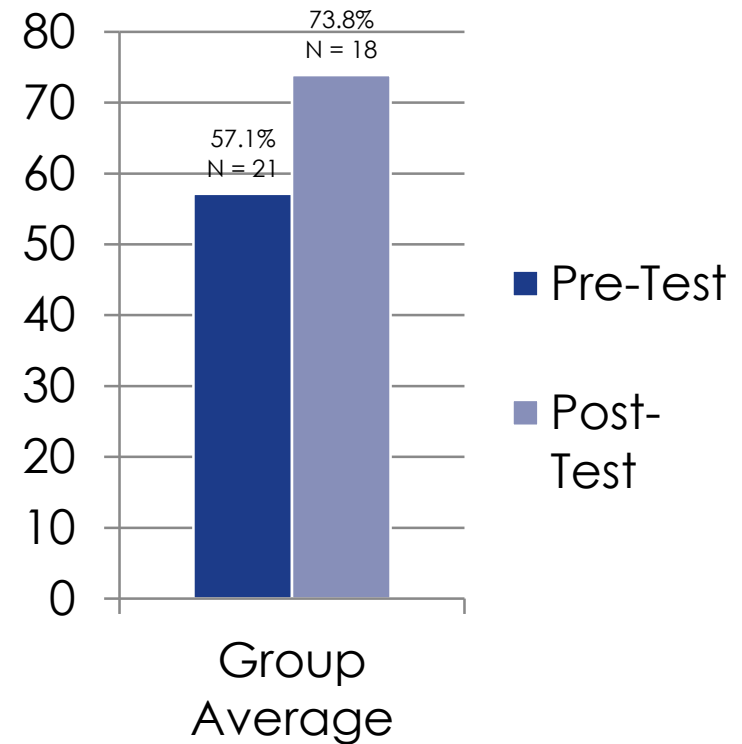
- Attendance: 36
- Administered Quizzes: N=21
- Incomplete Post-Test: N=3
- Pretest Avg: 57.1%
- Post Test Avg: 73.8

■ Apam

- Attendance: 29
- Administered Quizzes: N=20
- Incomplete 1wk Post-Test: N=9
- Pretest Avg: 69.6%
- Post-Test Avg: 77%
- 1 Wk Follow up Post-Test: 100%

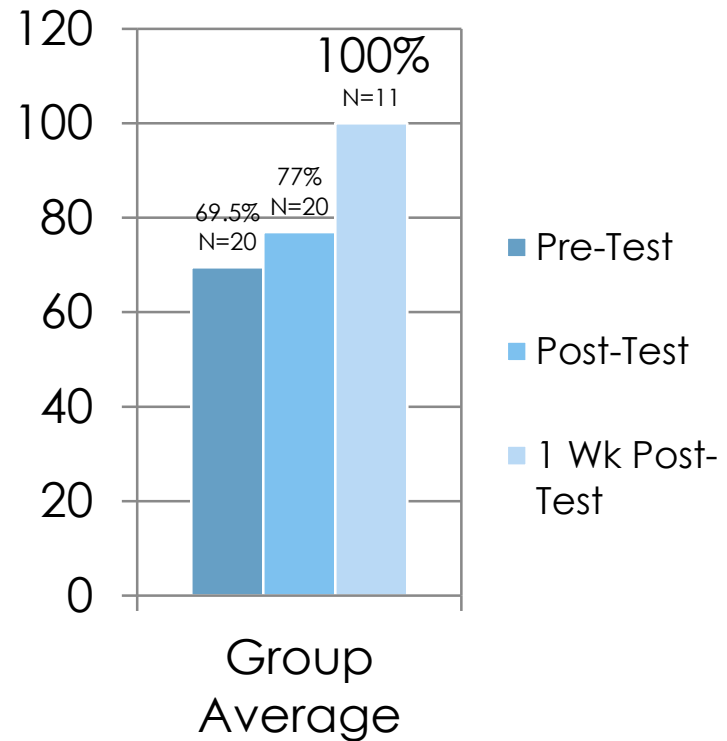
Results (Axim)

Test #	Pre-Test	Post-Test
AXIM		
1	30	60
2	40	80
3	60	90
4	60	80
5	90	100
6	60	90
7	50	60
8	50	50
9	40	40
10	60	80
11	40	70
12	60	70
13	60	60
14	80	100
15	40	90
16	60	70
17	70	70
18	70	70
19	40	---
20	60	---
21	80	---
Average	57.1428571	74.7058824



Results (Apam)

Test #	Pre-Test	Post Test	1 Wk Follow up	Ward
1	100	80	---	---
2	80	80	---	---
3	60	60	---	---
4	50	60	---	---
5	90	90	---	Peds
6	60	70	---	A&E
7	50	90	---	Female
8	60	90	---	Peds
9	90	90	---	Theatre
10	70	70	100	Theatre
11	90	90	100	OPD
12	70	70	100	OPD
13	60	60	100	OPD
14	80	80	100	OPD
15	60	90	100	Eye
16	40	40	100	Eye
17	70	70	100	Eye
18	90	100	100	Korle-Bu
19	70	90	100	Korle-Bu
20	50	70	100	A&E
Averages	68.75	78.75	100	



Limitations

■ Axim Limitations

- Not enough tests available due to unexpected turnout
- Inability to identify people due to instructions to put initials instead of full name
- No Post-Test review of answers
- Difficulty in administering post test post site visit
- Not as many data points as Apam (ward, 1 wk exam, etc)

■ Apam Limitations

- Smaller sample size of 1 wk follow up

Future Directions

- Appoint the employees with the highest scores who have demonstrated enthusiasm as continuing medical education liaisons
 - This person will be responsible for creating clinical vignettes to be administered to hospital staff
 - Ensuring patient safety and adherence to protocols
 - Brainstorm incentives for high performing health care professionals
- Monitor the management logs to ensure appropriate treatment
- Data analysis: Stratify questions by concept to highlight areas of improvement

Case

- 58F w/ a PMH of chronic HTN who has been noncompliant with medications presents to the A&E complaining of new onset palpitations and mild intermittent substernal chest pain that started around 8am. She reports dizziness, visual changes, nausea, **oliguria**, and headache, but denies dyspnea, diaphoresis, pleuritic chest pain, and lower extremity edema
- Physical Exam revealed a blood pressure of **220/108** and a tachycardic HR of 106. She had bounding carotid pulses, a 3/6 systolic murmur, and a displaced PMI. She was clear to auscultation bilaterally. No cyanosis, clubbing or edema

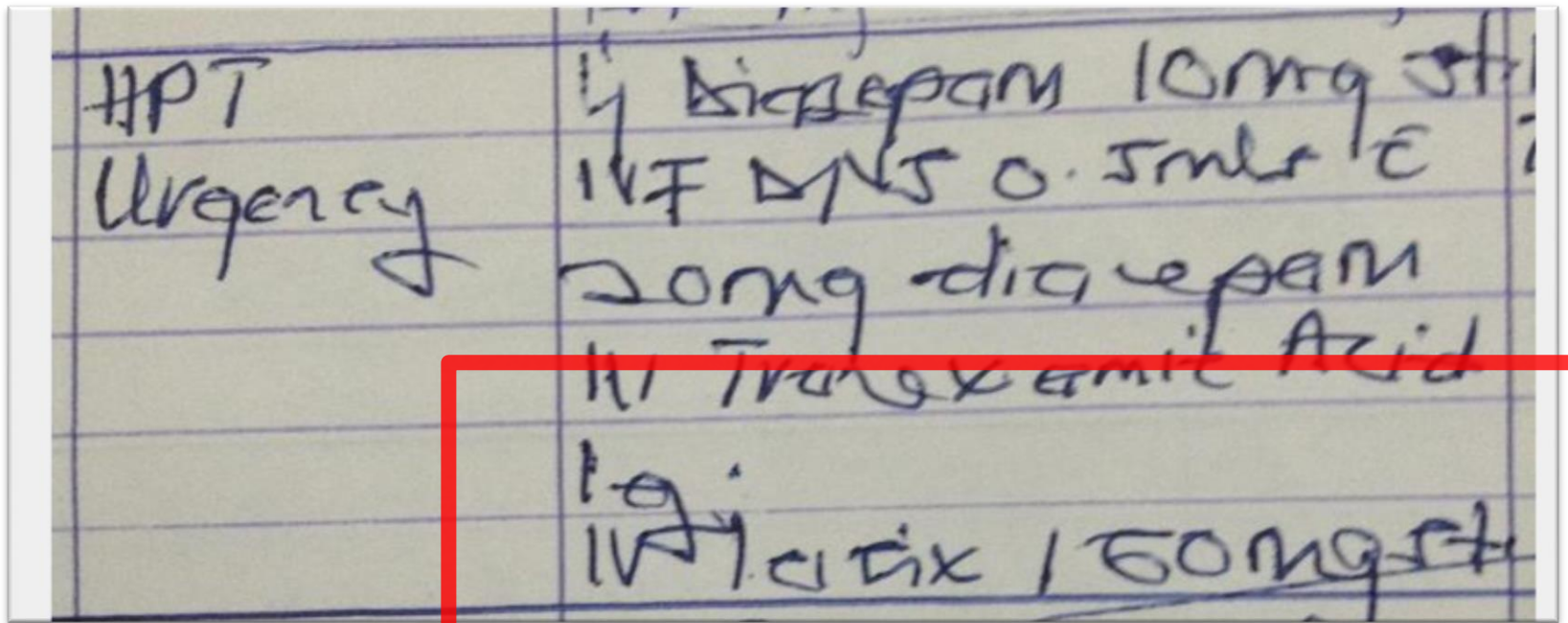
Case

- This clinical scenario is most likely consistent with
 - A. Hypertensive Urgency
 - B. Hypertensive Emergency
 - C. Acute Pulmonary Edema
 - D. None of the above

Case

- What is the next best step in management?
 - A. Administer STAT Lasix 80mg IV q2hr until symptoms resolve
 - B. Administer Hydralazine 5mg IV STAT followed by 5-10mg q10mins until BP is stabilized at a SBP of 180mmHg
 - C. Administer Lisinopril 40mg PO **AND** Nifedipine 90mg PO and monitor patient in the A&E until his blood pressure improves before discharging him on oral medications.
 - D. Start patient on Dobutamine 20mcg/kg/min to optimize cardiac contractility
 - E. None of the above

Case



- The patient given a hypertensive urgency diagnosis and was given Lasix 160mg IV, Diazepam 20mg and 500cc of DNS. She was transferred to the female ward and was discharged overnight.

Questions????

