

**THE COMPARISON STUDY ON DIURETIC EFFECT
IN FUROSEMIDE IV BOLUS INJECTION AND
CONTINUOUS INFUSION IN ASCITES
CIRRHOTIC PATIENT**

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OUTLINE :

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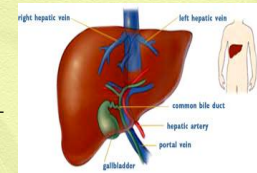
Background

- A common complication of cirrhosis is ascites and it should be managed by salt restriction and diuretic therapy
- Yelton (1995) : continuous infusion of Furosemide works more effectively compared to bolus injection because it can assure the constant urine's flow frequently
- There is no study performed in ascites cirrhotic patients.



Objective

- *To compare Furosemide effectiveness administered through IV bolus injection and continuous infusion in ascites cirrhotic patients.*



Type of Study

Experimental trial and prospective design on ascites cirrhotic patients as the main subject in general medicine ward at Dr. Ramelan Navy hospital, Surabaya from November 28th 2007 to February 28th 2008

- Cirrhotic patients with ascites
- Urine output
- Measuring body weight
- Measuring blood pressure, electrolyte, BUN and creatinin
- Measuring albumin concentration

VARIABLE OF RESEARCH

Type of Participants

- Adult patients (18-65 years old), without any complication of acute or chronic renal disease, cardiovascular disease and pleural efusion.
- Patients with cirrhotic hepatic and / or known to have a cirrhotic hepatic history as well as ascites when coming to the hospital.
- Inpatients at Dr. Ramelan Navy Hospital, Surabaya
- Patients suffering from Diabetic Mellitus in good control

Methods of Research

SAMPLING TECHNIQUE

nonprobability sampling ie purposive sampling based on inclusion and exclusion

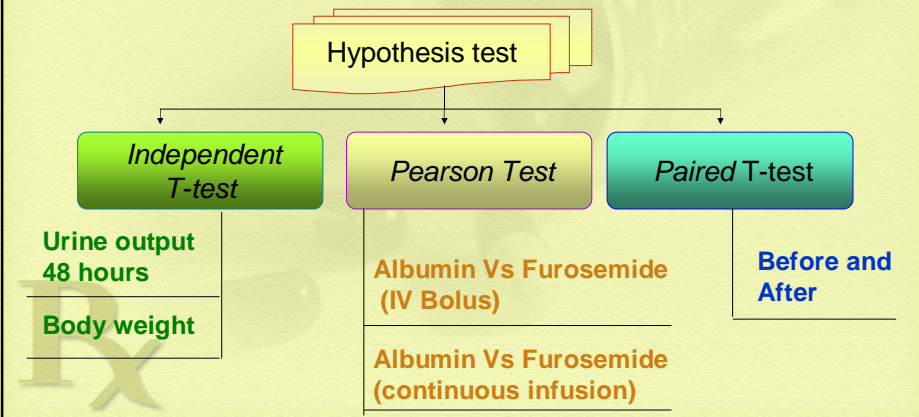
DATA COLLECTING TECHNIQUE

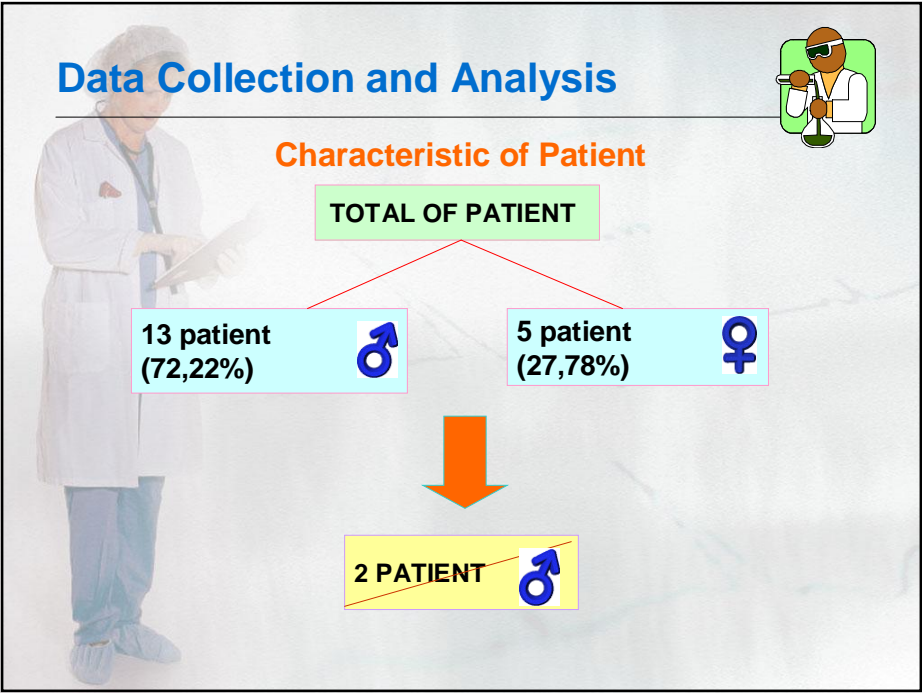
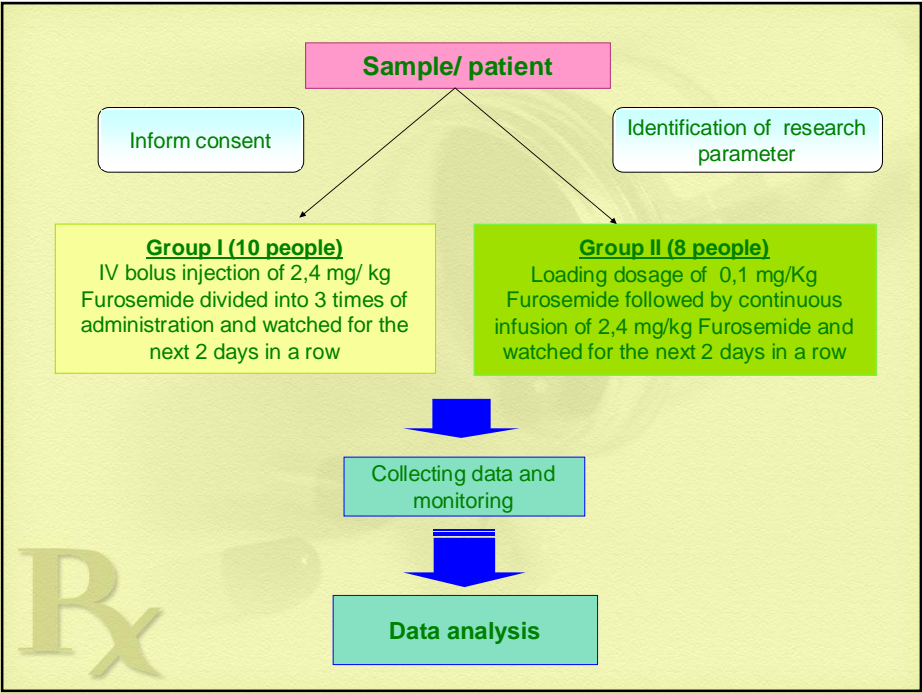
- Measuring / taking notes of urine output and body weight
- Examining blood pressure, electrolyte, uric acid, BUN, creatinin and albumin
- Observating the patient's condition as well as gaining information from patient, doctor and nurse associated with drug effects and
- Having the patient medical record

Methods of Research (CON'T)

DATA ANALYSIS

With statistic program SPSS 12.0 version for Windows of which the confidence level is $p < 0,05$





Data Collection and Analysis



Sample	Frequency		Total
	IV Bolus	Cont. Infusion	
Male	8 (50,00%)	3 (18,74%)	11 (68,75%)
Female	1 (6,25%)	4 (25%)	5 (31,25 %)
Age	Range 42-65 years old	53-65 years old	
	mean 59 year old	60 year old	
Complication	HM 1 person	3 person	4 person
	Melena 2 person	1 person	3 person
Child pugh score	B 9	6	15 person
	C -	1	1 person
Albumin Conc.	range 2,2 - 3,3 g/dl	2,5 - 3,5 g/dl	
	Mean 2,6 g/dl	2,9 g/dl	
Other disease	DM 4 person	2 person	6 person
	HT -	1 person	1 person
Other	paracentesis 4 person	2 person	6 person
	edema 6 person	3 person	9 person

Data Collection and Analysis



Descriptive data		IV bolus	Continuous Infusion
Dose of Furosemide (mg)	Min-max	127,4 - 169	115,2 - 204
	average	149,7	151,4
	Variation	202,8	888,9
Urine output 48 jam (L)	Min-max	1,34 – 6,05	2,31 – 9,46
	Average	3,88	5,88
	Variation	232507,8	6996573,9
Body weight reduction (kg)	Min-max	0,7 -7,1	2 -9,6
	Average	3.6	5,6
	Variation	4.13	6,4

Data Collection and Analysis

Observation of Furosemide effect with IV Bolus Injection and Continuous Infusion

Observation		IV bolus		Continuous Infusion	
		Mean	Sig. (2 tailed)	Mean	Sig. (2 tailed)
Sistole	before	118,89	0,580	120,83	0,111
	after	117,22		110,83	
Diastole	before	73,89	0,049	72,50	0,086
	after	66,11		66,67	
Na	before	135,44	0,572	138,66	0,801
	after	136,11		138,66	
K	before	4,11	0,001	3,90	0,185
	after	3,57		3,50	
Uric Acid	before	6,92	0,323	6,21	0,118
	after	7,57		7,22	
BUN	before	20,31	0,460	16,68	0,684
	after	18,9		15,97	
Creatinin	before	1,09	0,440	0,96	0,541
	after	1,07		1,01	

Data Collection and Analysis

Result of Hypothesis Test

H1 : no difference in urine output of Furosemide given by IV bolus injection and continuous infusion in an ascites cirrhotic patient (p = 0,093)

	Administering	N	Average	SD	Std. Error Mean	Sig.
UO 48 h (L)	bolus	9	3,88	1524.82	508.27	0,093
	Cont. infusion	7	5,88	2645.10	999.75	

H2 : no difference in body weight's reduction of Furosemide given by IV bolus injection and continuous infusion in an ascites cirrhotic patient (p = 0,493)

	Administering	N	Average	SD	Std. Error Mean	Sig.
BW reduction (kg)	bolus	9	3.57	2.03	0.68	0,493
	Cont. infusion	7	5.63	2.54	0.96	

Data Collection and Analysis

H3 : no relationship between albumin concentration with effectiveness of IV bolus injection of Furosemide through decrease of body weight and urine output

Correlation	Pearson correlation	
	UO 48 hr	BW reduction
Albumin Sig. (2 -tailed)	0,130 0,794	0,006 0,987

H4 : no relationship between albumin concentration with effectiveness of continuous infusion of Furosemide through decrease of body weight and urine output

Correlation	Pearson correlation	
	UO 48 hr	BW reduction
Albumin Sig. (2 -tailed)	- 0,414 0,356	- 0,392 0,384

Conclusion



- no difference urine output
- no difference of body weight loss
- There is no relationship between albumin concentration and efectiveness of Furosemide (IV bolus and continuous infusion)
- Administering Furosemide by IV bolus injection tends to result in the decrease of potassium level
- no significant difference in blood pressure, electrolyte, uric acid, BUN, creatinin measure on administering furosemide continuously.

Suggestion



- ❖ Consider to add potassium and sodium supplement also monitor the changes of electrolyte and dehydration condition
- ❖ Conduct further research into Furosemide effects by IV Bolus injection and continuous infusion with a greater amount on the patient first entering the hospital with *ascites* caused by cirrhosis
- ❖ Conduct further research into Furosemide effectiveness on hypoalbuminemia patient (albumin conc. < 2,5 mg/dl)



Thank You..

Open for
Discussion



R_x

Data Collection and Analysis

Measuring of total urine output and body weight (IV Bolus injection)

No	Name/ sex/ Age (th)	Intake fluid (ml)	Urine output (L)		Body weight (kg)		
			48 jam	Δ	before	after	Δ
1	Sya/ L/ 65	I:1800; II: 780	6,60	4,02	56,3	53,3	3
2	Swe/ L/ 64	I :1400; II :1050	7,58	5,13	65,4	58,3	7.1
3	Nur/ L/ 65	I: 2550; II :1000	5,97	2,42	61,3	58,8	2.5
4	Soe/ L/ 62	I :1400; II : 700	8,15	6,05	65,9	60,7	5.2
5	SKR/ L/ 59	I : 750; II : 500	2,59	1,34	52,3	51,6	0.7
7	SFL/ L/ 42	I :1250; II :1150	7,74	5,34	69,8	64,6	5.2
8	Dju/ L/ 53	I :1280; II : 800	5,09	3,01	70,3	68,7	1.6
9	Ktn/ P/ 63	I: 2030; II: 630	5,44	2,78	53.1/	50.6	2.5

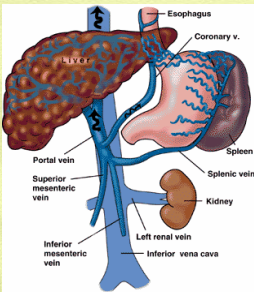
Data Collection and Analysis

Measuring of Urine output and body weight (continuous infusion)

No	Name/ sex/ Age (th)	Intake fluid (ml)	Urine output (L)		Body weight (kg)		
			48 jam	Δ	before	after	Δ
1	Fau/ P/ 61	I :1180; II:1050	11,69	9,46	78,2	73,6	9,6
2	KLH/ P/ 61	I : 600; II : 600	6,59	5,39	61,5	57,2	4,3
3	Gun/ P/ 54	I : 900; II : 850	5,08	3,33	48	42,7	5,3
4	NJT/ L / 65	I :1340 ; II:1400	5,05	2,31	59,2	57,2	2,0
5	Dju/ L/ 53	I :1100; II :1650	11,30	8,55	68,5	61,3	7,2
6	BK/ L/ 62	I :1160; II :1180	6,94	4,60	52,2	47,5	4,7
7	Wat/ P/ 64	I :1342; II :1000	9,54	7,20	69,4	62,1	7,3

Ascites

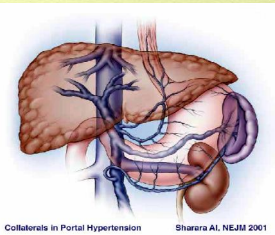
- is major complication of cirrhosis, it is associated with poor quality of a life, and increases risk of infection and renal failure
- 20 % of cirrhotic patients have ascites at the time of diagnosis while 30 and 50 % will develop ascites by 5 and 10 years respectively



Definition

Treatment

- **Bed rest**
- **Salt restriction < 2g/ day**
- **Diuretic**
- **Paracentesis**



Independent T-test



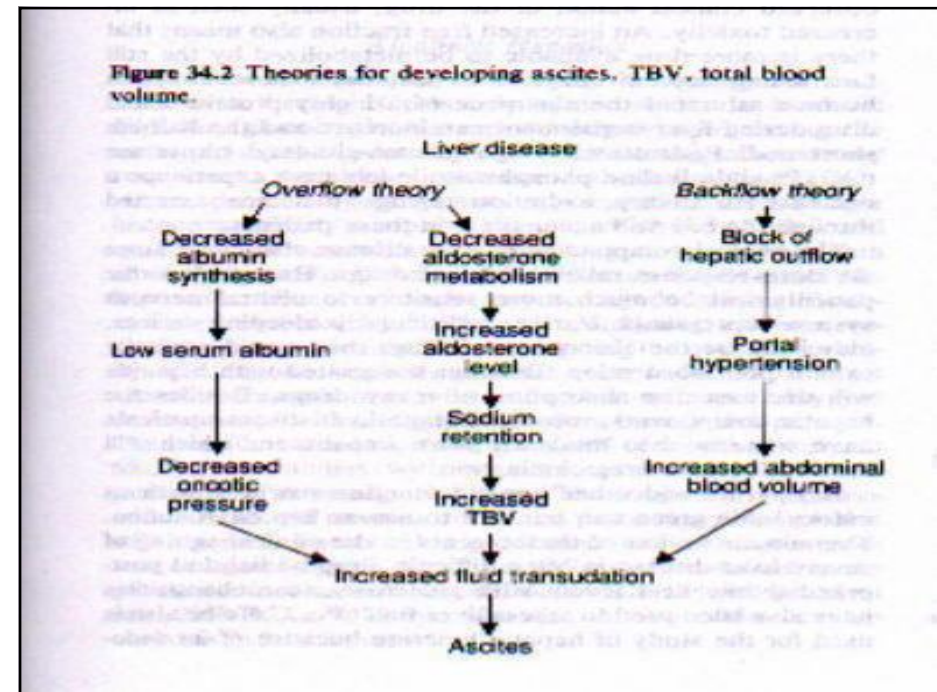
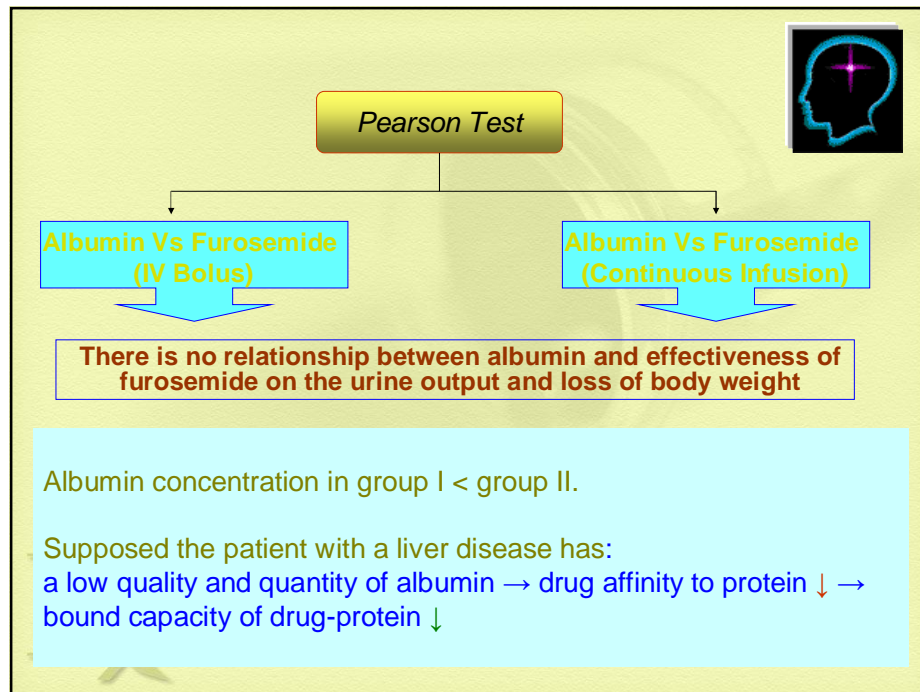
Urine output

Body Weight

No significant difference (p = 0,093).

No significant difference (p = 0,493).

- mean of urine output during 48 hours in group II (5,88L) >group I (3,88L). Mean of body weight's reduction in group II (5,6 kg) > group I (3,6 kg).
- Supposed there is a big variation of urine data :
 - mainly in new patient (sensitivity of nephron and farmacokinetic profile)
 - Tolerance of Furosemide
 - used of catheter



Methodology of Research

EXCLUSION CRITERIA

- Female patient in pregnancy or lactation period
- Patient with super infection/ sepsis
- Patient resistant to diuretic or *refractory ascites*
- Patient with hyponatremia condition (< 120 Meq/L)
- Patient with sensitivity of Furosemide
- Patient with another therapy increasing or decreasing diuretic effect of Furosemide
- Patient with another therapy with an interaction with Furosemide, increasing the risk of side effects and dangerous to patient
- Patient with HE, GI bleeding due to gastroesophageal varices, HRS, *per magna ascites*, *Spontaneous Bacterial Peritonitis/ SBP*
- Patients who refuse to volunteer in the research

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