

C'è qualcosa di nuovo per l'insufficienza cardiaca acuta

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Centro di Riferimento per l'Epidemiologia
e la Prevenzione Oncologica in Piemonte



2016 ESC Guidelines for the diagnosis and treatment of acute and chronic heart failure

Recommendations	Class ^a	Level	Ref ^c
Upon presentation a measurement of plasma natriuretic peptide level (BNP, NT-proBNP or MR-proANP) is recommended in all patients with acute dyspnoea and suspected AHF to help in the differentiation of AHF from non-cardiac causes of acute dyspnoea	I	A	531–534
At admission in all patients presenting with suspected AHF, the following diagnostic tests are recommended:			
a. 12-lead ECG;	I	C	
b. chest X-ray to assess signs of pulmonary congestion and detect other cardiac or non-cardiac diseases that may cause or contribute to the patient's symptoms;	I	C	
c. the following laboratory assessments in the blood: cardiac troponins, BUN (or urea), creatinine, electrolytes (sodium, potassium), glucose, complete blood count, liver function tests and TSH.	I	C	

Bedside thoracic ultrasound for signs of interstitial oedema and pleural effusion may be useful in detecting AHF if the expertise is available.

ESC Guidelines for the diagnosis and treatment of acute and chronic heart failure 2012

Recommendations	Class ^a	Level ^b
Investigations to consider in all patients		
Transthoracic echocardiography is recommended to evaluate cardiac structure and function, including diastolic function (Section 4.1.2), and to measure LVEF to make the diagnosis of HF, assist in planning and monitoring of treatment, and to obtain prognostic information.	I	C
A 12-lead ECG is recommended to determine heart rhythm, heart rate, QRS morphology, and QRS duration, and to detect other relevant abnormalities (Table 5). This information also assists in planning treatment and is of prognostic importance. A completely normal ECG makes systolic HF unlikely.	I	C
Measurement of blood chemistry (including sodium, potassium, calcium, urea/blood urea nitrogen, creatinine/estimated glomerular filtration rate, liver enzymes and bilirubin, ferritin/TIBC) and thyroid function is recommended to: (i) Evaluate patient suitability for diuretic, renin–angiotensin–aldosterone antagonist, and anticoagulant therapy (and monitor treatment) (ii) Detect reversible/treatable causes of HF (e.g. hypocalcaemia, thyroid dysfunction) and co-morbidities (e.g. iron deficiency) (iii) Obtain prognostic information.	I	C
A complete blood count is recommended to: (i) Detect anaemia, which may be an alternative cause of the patient's symptoms and signs and may cause worsening of HF (ii) Obtain prognostic information.	I	C
Measurement of natriuretic peptide (BNP, NT-proBNP, or MR-proANP) should be considered to: (i) Exclude alternative causes of dyspnoea (if the level is below the exclusion cut-point—see Figure 1—HF is very unlikely) (ii) Obtain prognostic information.	IIa	C
A chest radiograph (X-ray) should be considered to detect/exclude certain types of lung disease, e.g. cancer (does not exclude asthma/COPD). It may also identify pulmonary congestion/oedema and is more useful in patients with suspected HF in the acute setting.	IIa	C

Diagnosing Acute Heart Failure in the Emergency Department: A Systematic Review and Meta-analysis

Jennifer L. Martindale, MD, Abel Wakai, MD, Sean P. Collins, MD, MSc, Phillip D. Levy, MD, MPH, Deborah Diercks, MD, Brian C. Hiestand, MD, Gregory J. Fermann, MD, Ian deSouza, MD, and Richard Sinert, DO

	Perhaps the <u>most robust data</u> in our pooled lung US sample comes from the multicenter study (N = 1,005). Patient exclusions were limited to those with initially obvious causes of dyspnea (traumatic pneumothorax) and intubated patients. Lung US in this	LR+ (95% CI)	LR- (95% CI)
Lung US			
Positive B-line scan* ^{23, 24, 48, 62, 63, 81, 90, 91}		2.12 (1.28–3.51)	0.16 (0.05–0.51)
Pleural effusion(s) ^{63,90}		1.28 (0.89–1.83)	0.49 (0.22–1.10)
Bedside			
Respiratory			0.36
Red			0.35
Incr			0.54
di			
Lung Ultrasound-Implemented Diagnosis of Acute Decompensated Heart Failure in the ED A SIMEU Multicenter Study CHEST 2015; 148(1):1-9			
	respectively. Incorporation of lung US into the classification of AHF in this study led to a net reclassification improvement of 19% (95% CI = 14.6 to 23.6%). The authors of this study report that the vast majority of lung US examinations were performed within 40 minutes of ED presentation. The feasibility of lung US to rapidly identify pulmonary edema in real time shortly after ED presentation and before therapeutic intervention may increase the sensitivity of this test.	(95% CI)	(95% CI)
Electrocardiogram			
Ischemic changes ^{15,51}		2.9 (1.2–7.1)	0.78 (0.73–0.84)
T-wave inversion ⁶⁵		2.4 (1.2–4.8)	0.94 (0.90–0.98)
Atrial fibrillation ^{19,20,36,58,60,65}		2.2 (1.4–3.5)	0.88 (0.85–0.91)
ST-depression ^{58,65}		2.0 (1.0–3.8)	0.97 (0.95–1.00)
Normal sinus rhythm ^{8,12,62}		0.7 (0.5–0.9)	2.88 (1.26–6.57)
ST-elevation ⁵⁸		0.6 (0.2–1.7)	1.03 (0.96–1.11)
Chest radiograph			
Kerley B-lines ^{36,72}		6.5 (2.6–16.2)	0.88 (0.69–1.13)
Interstitial edema ^{15,66,72}		6.4 (3.4–12.2)	0.73 (0.68–0.78)
Cephalization ^{8,57,64,66,72}		5.6 (2.9–10.4)	0.53 (0.39–0.72)
Alveolar edema ^{15,66,72}		5.3 (3.3–8.5)	0.95 (0.94–0.97)
Pulmonary edema* ^{7,8,12,14,16,18–21,23,36,54}		4.8 (3.6–6.4)	0.48 (0.39–0.58)
Pleural effusion ^{12,20,58,60,72}		2.4 (1.6–3.6)	0.89 (0.80–0.99)
Enlarged cardiac silhouette ^{8,12,15,18,20,21}		2.3 (1.6–3.4)	0.43 (0.36–0.51)

background

Se volete parlare
di efficacia della
NIV dovete citare
studi condotti nel
vostro setting...



Prof. V.M. Ranieri

Congresso SIMEU 2010 – Rimini

background

In un setting come il
PS, in letteratura è
già stato dimostrato
che l'ecografia
polmonare è accurata



Dott. G.A. Cibinel

Un giorno di primavera nel 2010 – PS Pinerolo (TO)

background



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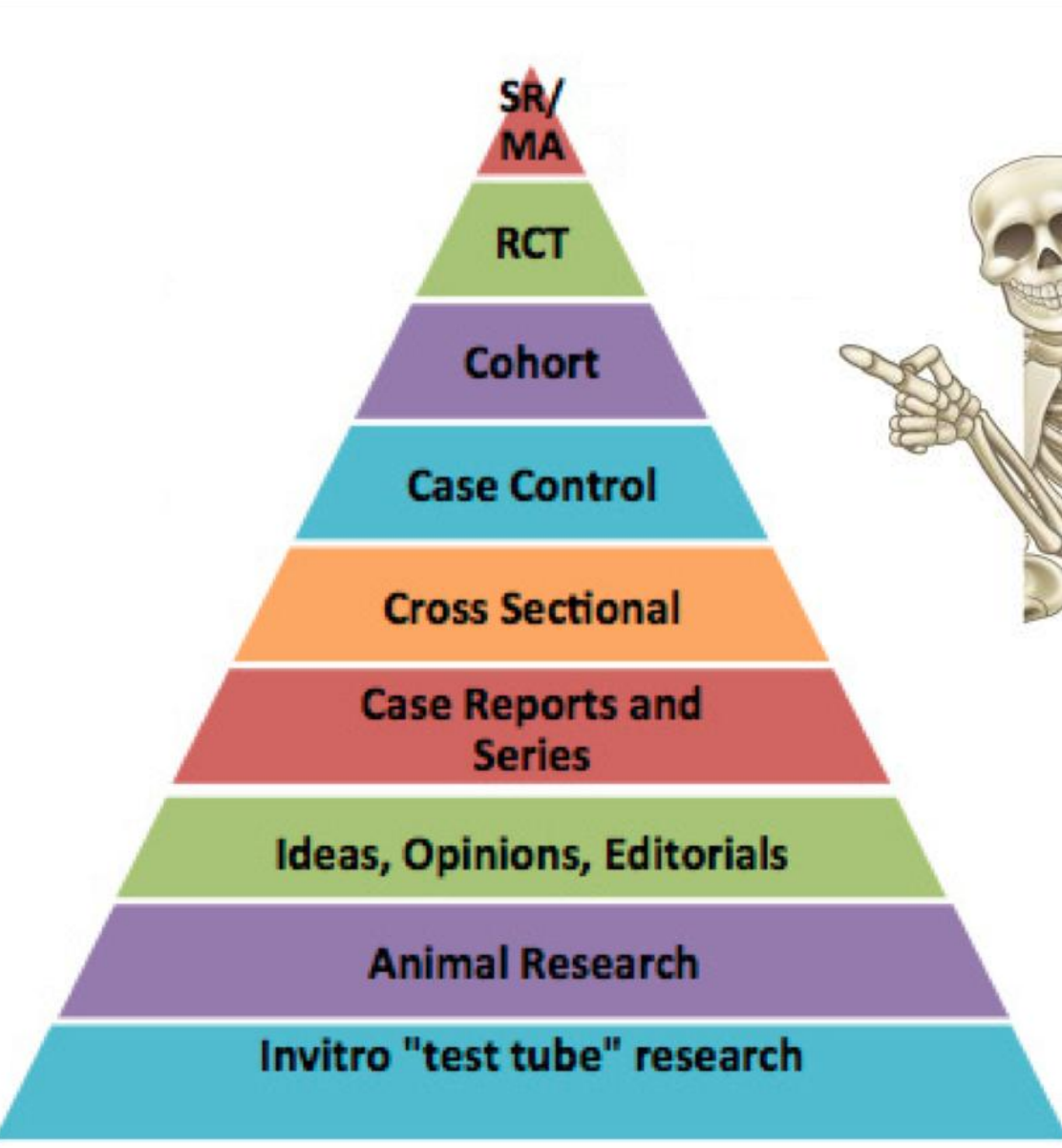
background

*EBM is the
conscientious, explicit
and judicious use of
current best evidence in
making decision about the
care of individual
patients*



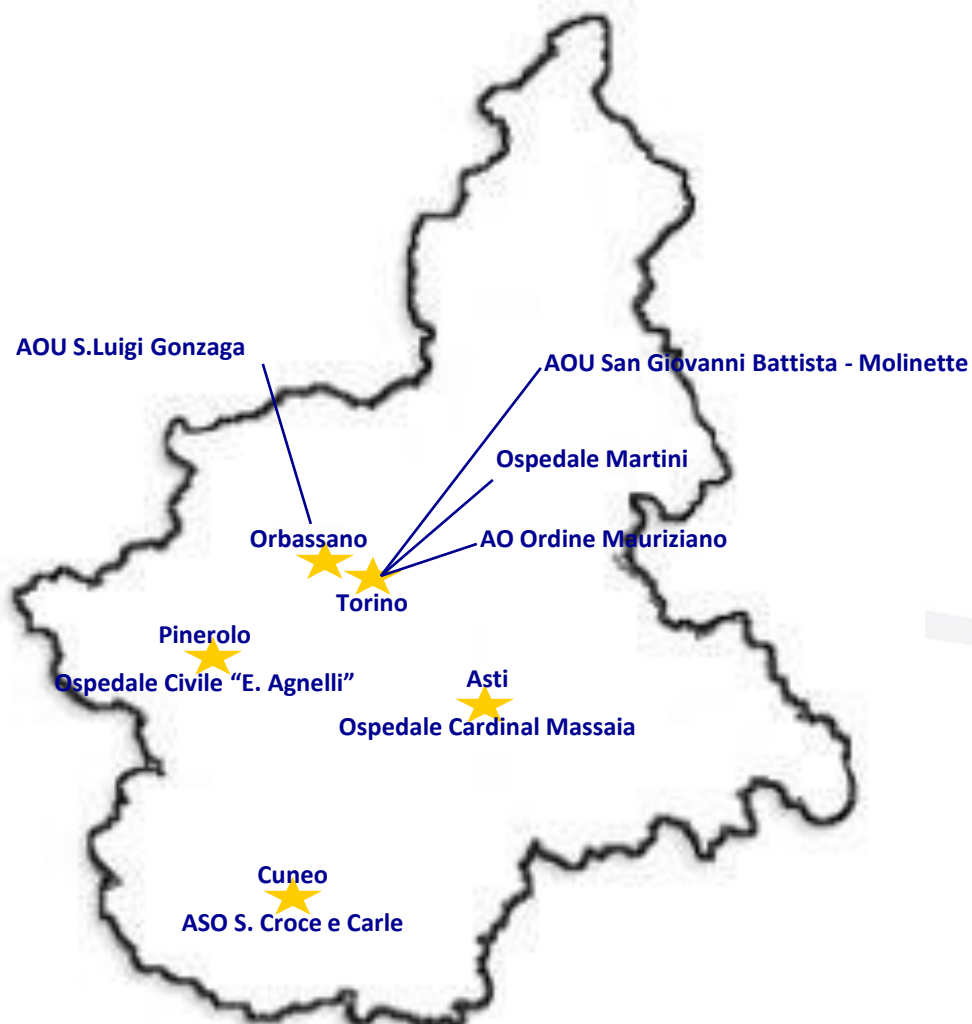
Sackett D. et al. BMJ 1996, 312: 71-72

Studio multicentrico - obiettivo



Valutare la capacità diagnostica dell'approccio clinico integrato con ecografia polmonare nel differentiare la dispnea da scompenso cardiaco acuto da quella per altre cause in Pronto Soccorso

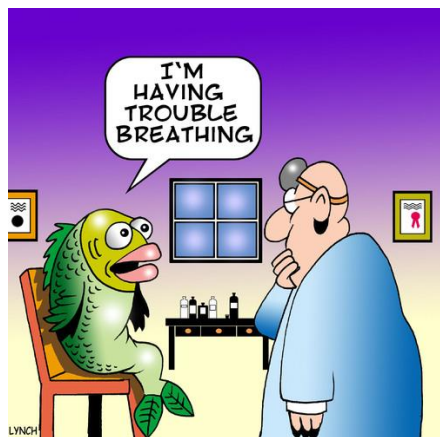
Studio multicentrico - metodi



Novembre 2010 – Ottobre 2012

Chest 2015; 148(1):1-9
www.clinicaltrials.gov

Studio multicentrico - metodi



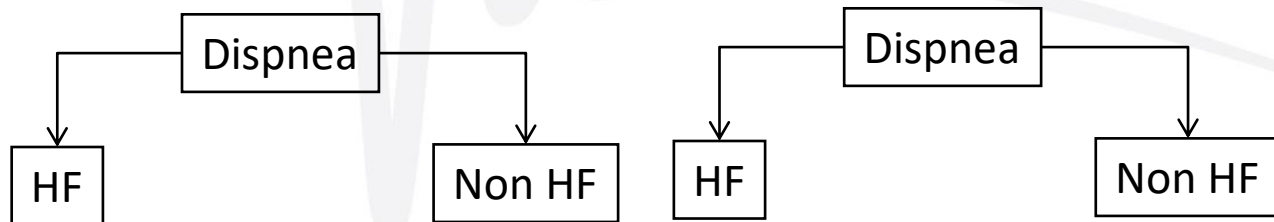
dispnea acuta



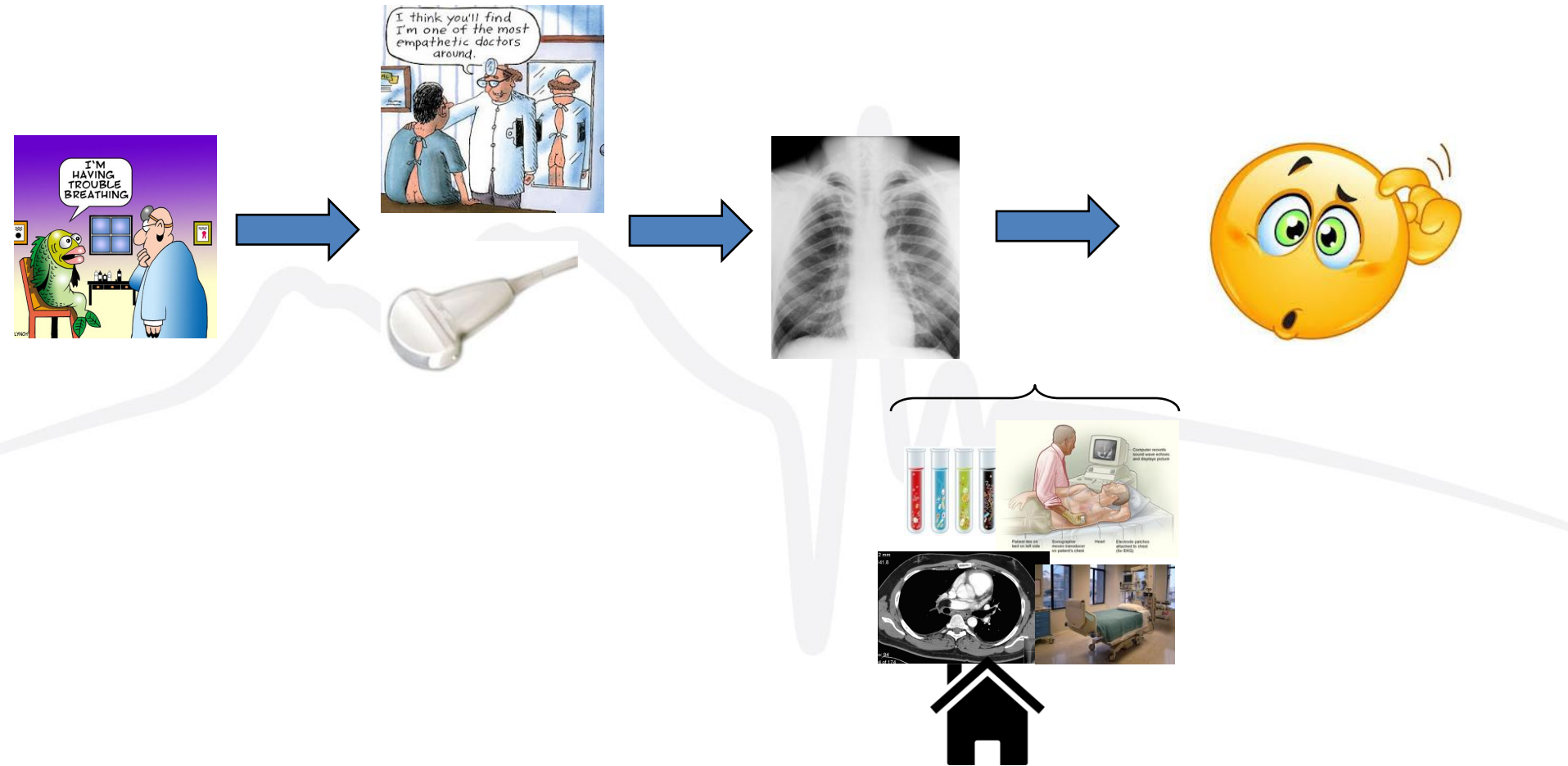
valutazione clinica



LUS-implemented



Studio multicentrico - metodi



Studio multicentrico - metodi



Medico d'urgenza
Cardiologo



Intensivista



Medico d'urgenza

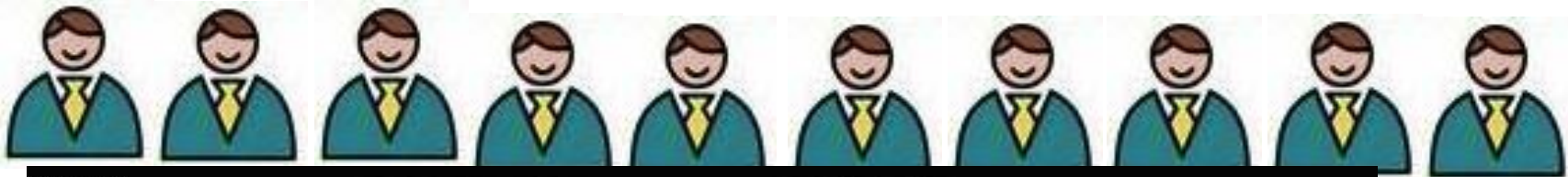
Studio multicentrico - risultati

TABLE 1] Demographic Characteristics and Medications of Patients Enrolled

Characteristics	ADHF (n = 463)	Noncardiac Dyspnea (n = 542)	All Patients (N = 1,005)
Age, median (IQR), y	78 (11)	76 (13)	77 (13)
Women	248 (53.6)	216 (39.8)	464 (46.2)
Baseline characteristics			
Tobacco use ^b	166 (35.8)	254 (46.9)	420 (41.8)
COPD	125 (27.2)	284 (52.2)	409 (40.7)
Asthma	3 (0.7)	35 (6.5)	38 (3.8)
Interstitial lung disease	19 (4.1)	38 (7)	57 (5.7)
Hypertension ^c	335 (72.4)	303 (55.9)	638 (63.5)
Congestive heart failure ^c	148 (32)	55 (10.2)	203 (20.2)
Ischemic cardiomyopathy/CAD	155 (33.5)	104 (19.2)	259 (25.8)
Other cardiomyopathies	169 (36.5)	71 (13.1)	240 (23.9)
Diabetes ^c	169 (36.5)	112 (20.7)	281 (27.9)
Arrhythmia ^d	161 (34.8)	106 (19.6)	267 (26.5)
Dyslipidemia ^c	100 (21.6)	60 (11.1)	160 (15.9)
Cerebrovascular accident ^c	37 (8)	42 (7.8)	79 (7.9)
CKD/chronic dialysis ^e	108 (23.3)	61 (11.3)	169 (16.8)
Neoplastic disease ^c	42 (9.1)	90 (16.6)	132 (13.1)
Thromboembolic disorder	11 (2.4)	27 (5)	38 (3.8)

Studio multicentrico - risultati

		Sensitivity	Specificity	PPV	NPV	LR+	LR-	p	
No. = 1005	Clinical work-up	85.3% (81.8-88.4)	90% (87.2-92.4)	88% (84.6-90.8)	87.8% (84.8-90.4)	8.6	0.2	< .01	
	LUS-implemented	97% (95-98.3)	97.4% (95.7-98.6)	97% (95-98.3)	97.4% (95.7-98.6)	37.5	0.03		
	LUS-alone	90.5% (87.4-93)	93.5% (91.1-95.5)	92.3% (89.4-94.6)	92% (89.4-94.1)	14	0.1	< .01	
	Chest radiography	69.5% (65.1-73.7)	82.1% (78.6-85.2)	76.8% (72.5-80.8)	75.9% (72.5-79.3)	3.9	0.4		
No.= 486	LUS-implemented	97.5% (94.9-99)	95.6% (91.9-98)	96.8% (94-98.5)	96.6% (93.1-98.6)	22.3	0.02	< .01	< .01
	BNP/NT-pro-BNP	85% (80.3-89)	61.7% (54.6-68.3)	75.1% (69.9-79.7)	75.1% (67.9-81.5)	2.2	0.2		
	LUS-alone	89.3% (85.1-92.7)	89.8% (84.8-93.6)	92.3% (88.4-95.1)	86 (80.7-90.4)	8.8	0.11		



2 mm

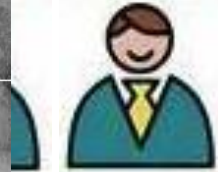
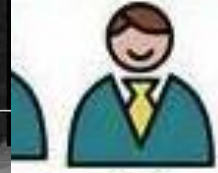
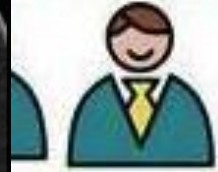
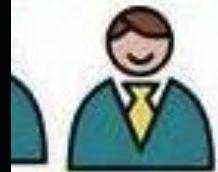
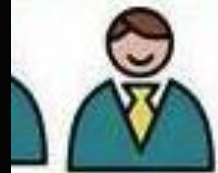
41.8

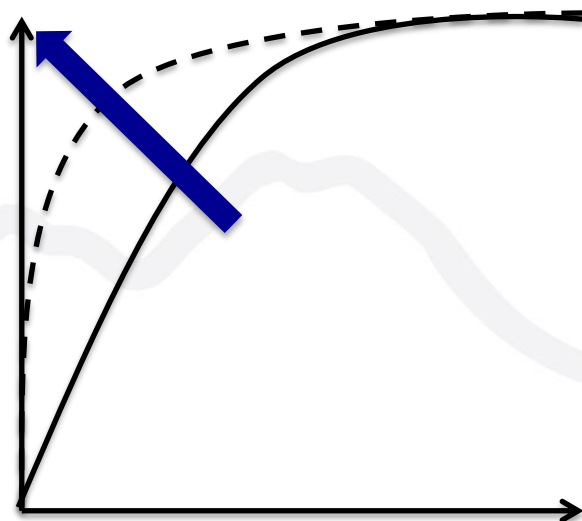


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4 of 174

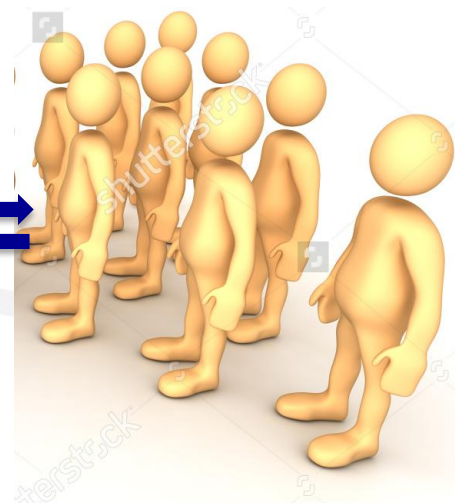
+ 1(3)
174





ROC - AUC

ACCURATEZZA



NRI

CLINICAL
USEFULNESS

Studio multicentrico - risultati

Patient with ADHF		LUS-implemented (post-LUS)		Total	Patients with non-cardiac dyspnea		LUS-implemented (post-LUS)		Total
		Non-cardiac dyspnea	ADHF				Non-cardiac dyspnea	ADHF	
Clinical work-up (pre-LUS)	Non-cardiac dyspnea	5	63	68	Clinical work-up (pre-LUS)	Non-cardiac dyspnea	481	7	488
	ADHF	9	386	395		ADHF	47	7	54
	Total	14	449	463		Total	528	14	542

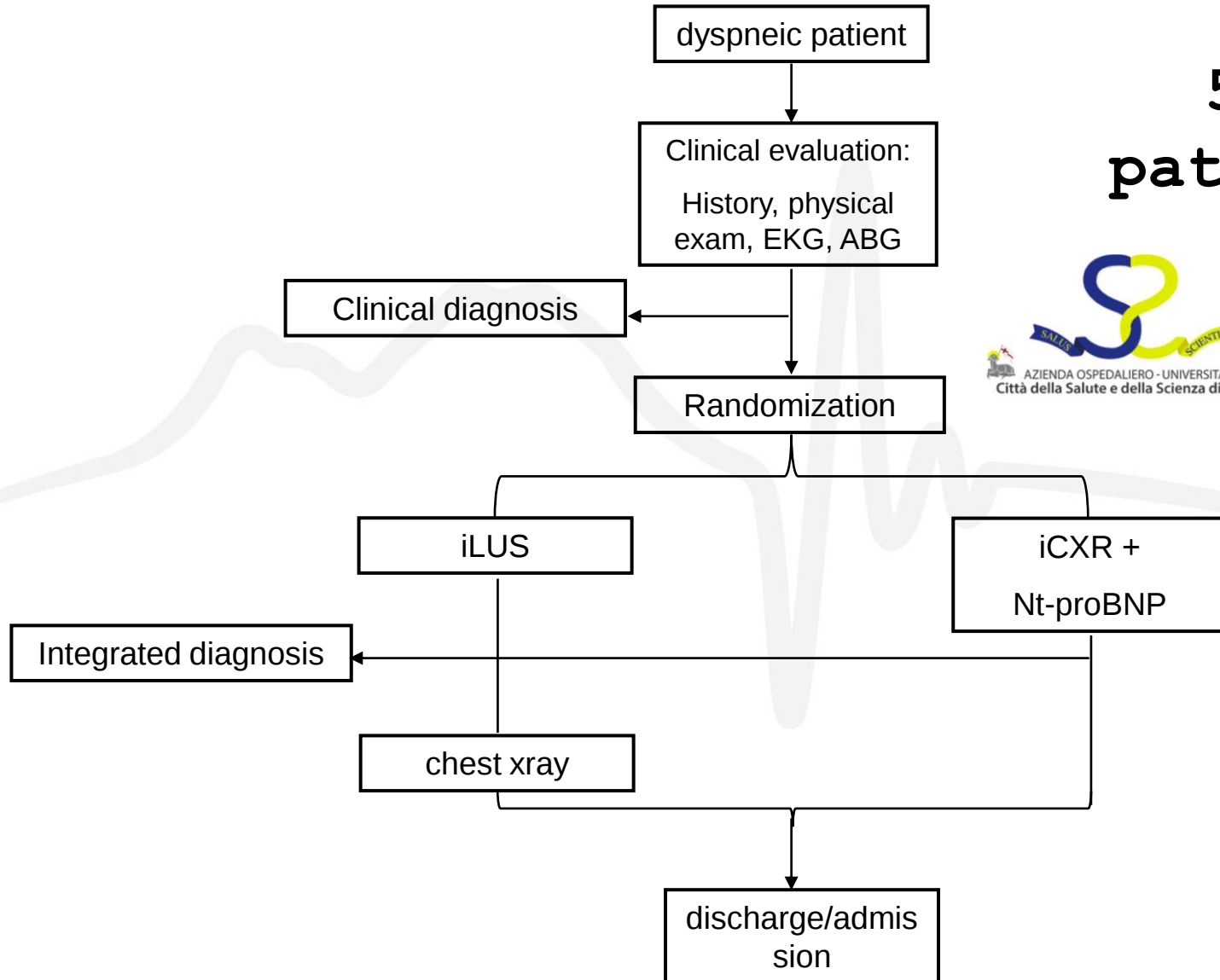
$$NRI_{\text{eventi}} = (63/463 - 9/463) = 11,7$$

$$NRI_{\text{non-eventi}} = (47/542 - 7/542) = 7,4$$

Dopo lo Studio multicentrico



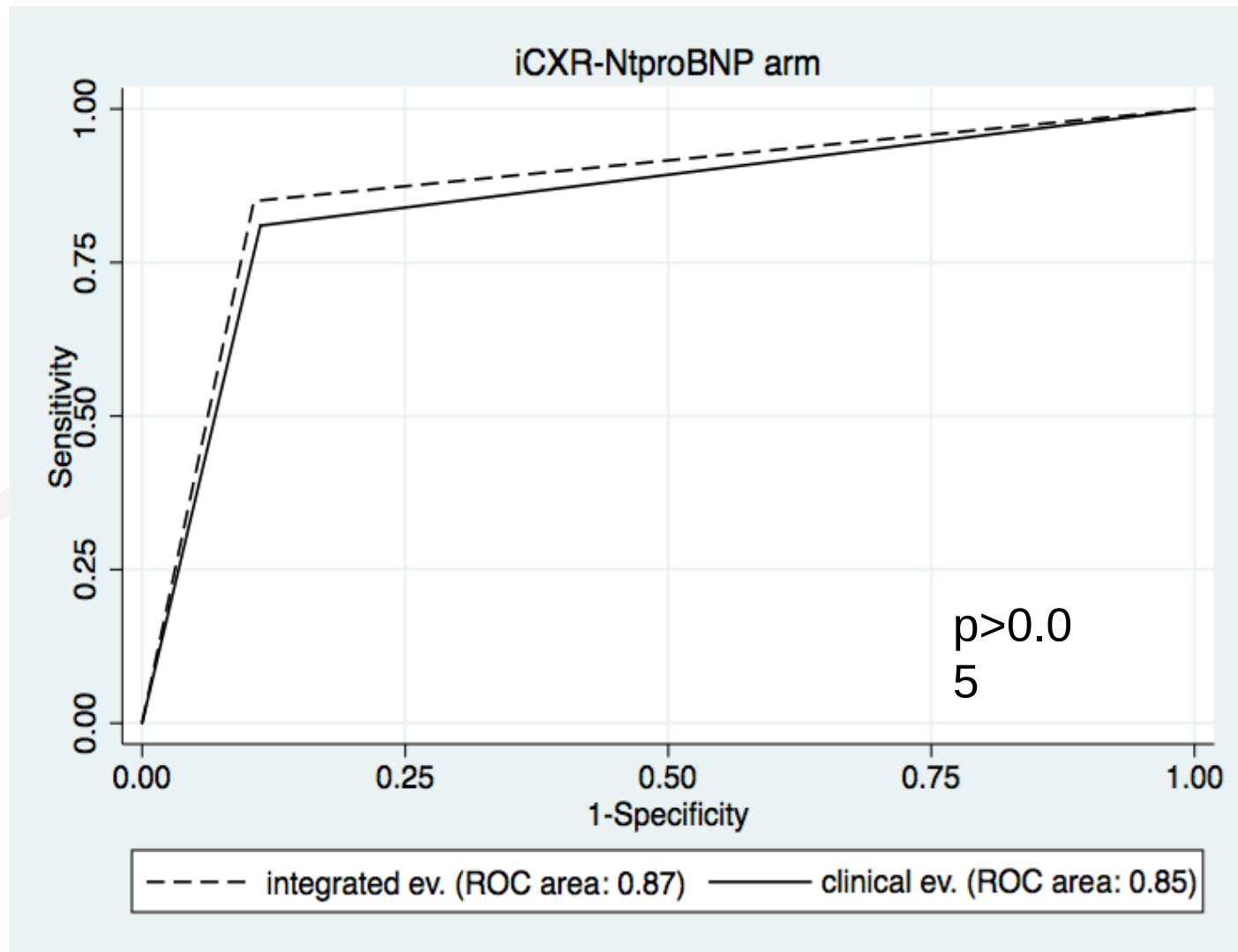
Trial Randomizzato Controllato



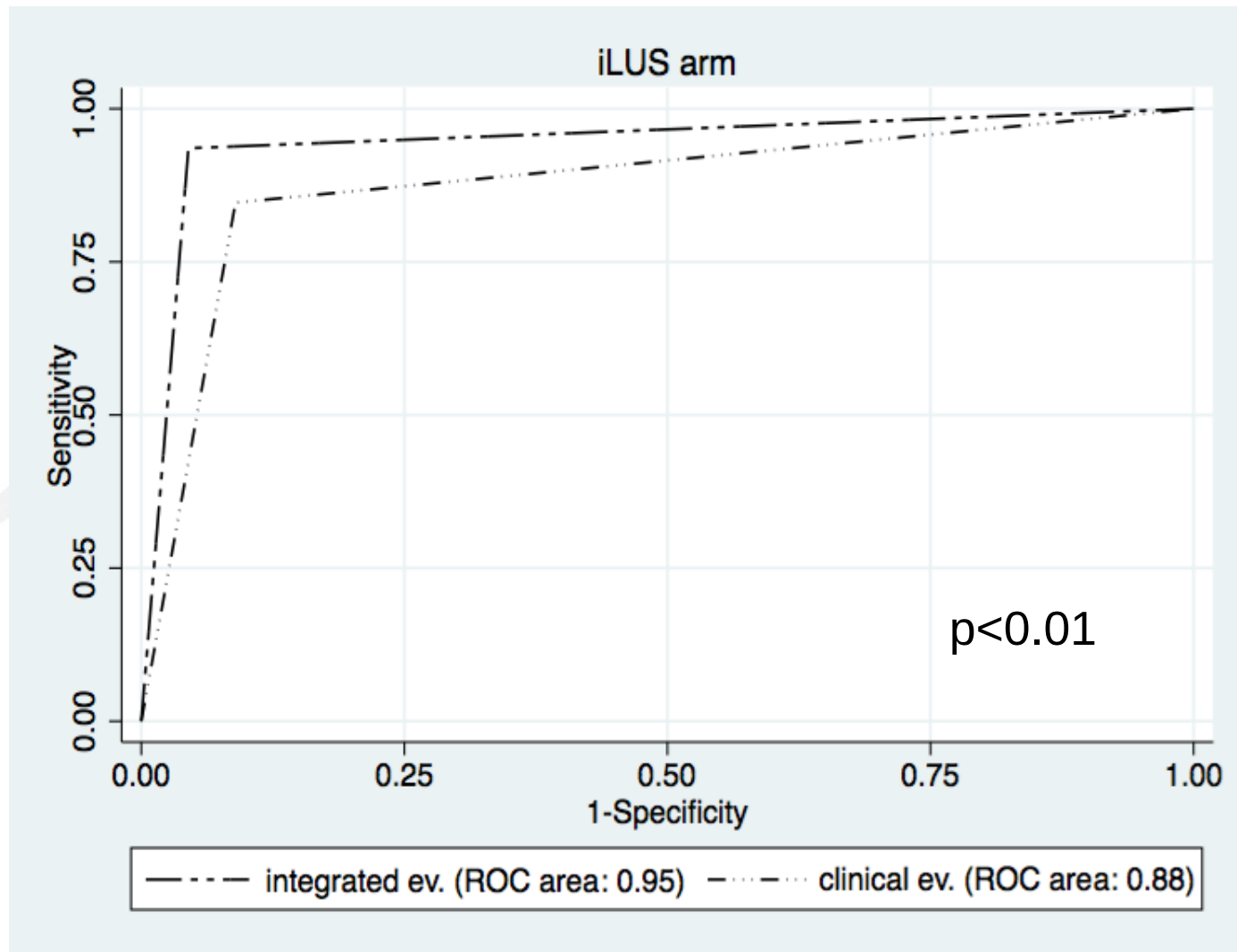
**518
patients**



Trial Randomizzato Controllato



Trial Randomizzato Controllato



Trial Randomizzato Controllato

CXR-NtproBNP IMPLEMENTED ARM				
Events = ADHF		CXR-NtproBNP-implemented		total
		non cardiac	ADHF	
Clinical work-up	non cardiac	11	8	19
	ADHF	4	77	81
	total	15	85	100

$$NRI_{\text{events}} = (8/100) - (4/100) = 4\%$$

CXR-NtproBNP IMPLEMENTED ARM				
Non Events = non cardiac dyspneas		CXR-NtproBNP-implemented		total
		non cardiac	ADHF	
Clinical work-up	non cardiac	131	11	142
	ADHF	12	6	18
	total	143	17	160

$$NRI_{\text{non-events}} = (12/160) - (11/160) = 0.6\%$$

LUS IMPLEMENTED ARM				
Events = ADHF		LUS-implemented		total
		non cardiac	ADHF	
Clinical work-up	non cardiac	6	13	19
	ADHF	2	103	105
	total	8	116	124

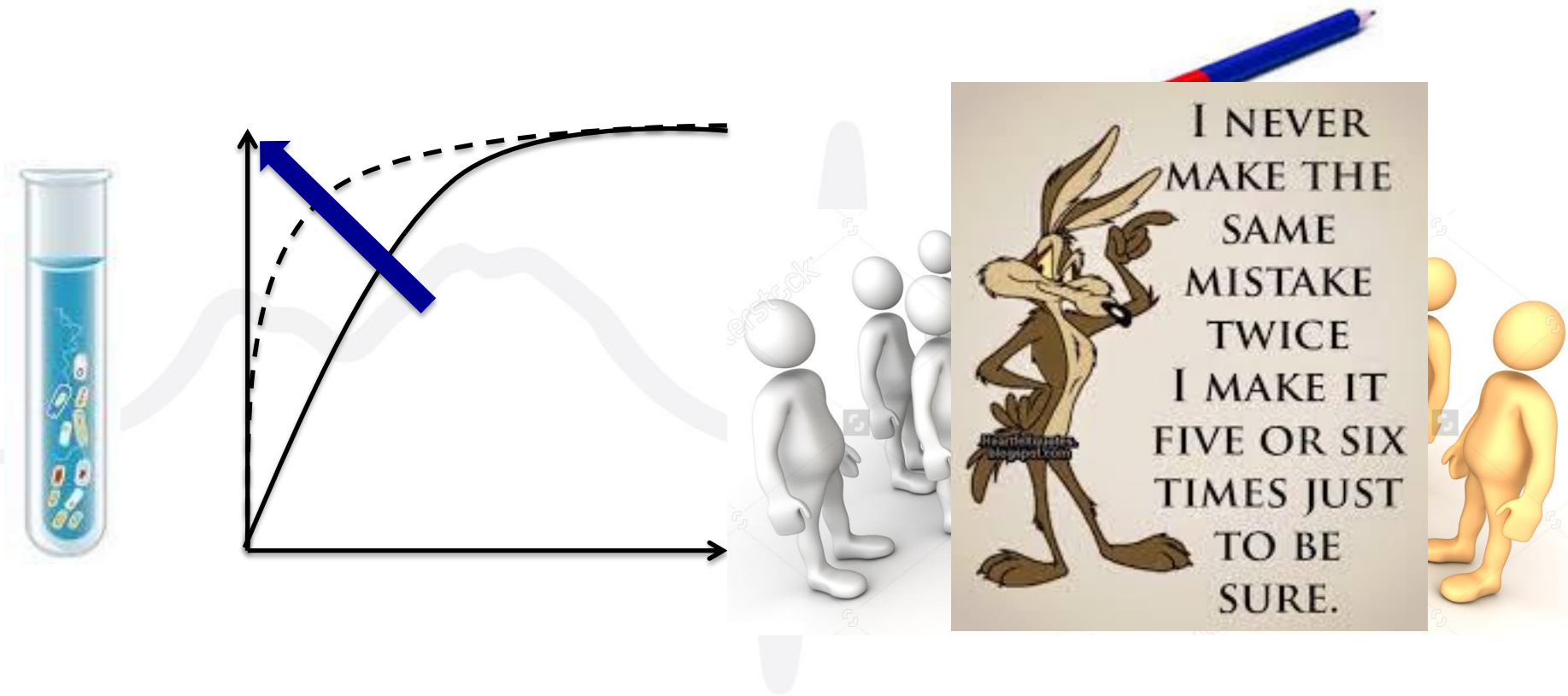
$$NRI_{\text{events}} = (13/124) - (2/124) = 8.9\%$$

LUS IMPLEMENTED ARM				
Non Events = non cardiac dyspneas		LUS-implemented		total
		non cardiac	ADHF	
Clinical work-up	non cardiac	119	3	122
	ADHF	9	3	12
	total	128	6	134

$$NRI_{\text{non-events}} = (9/134) - (3/134) = 4.5\%$$

Articolo in preparazione

Trial Randomizzato Controllato

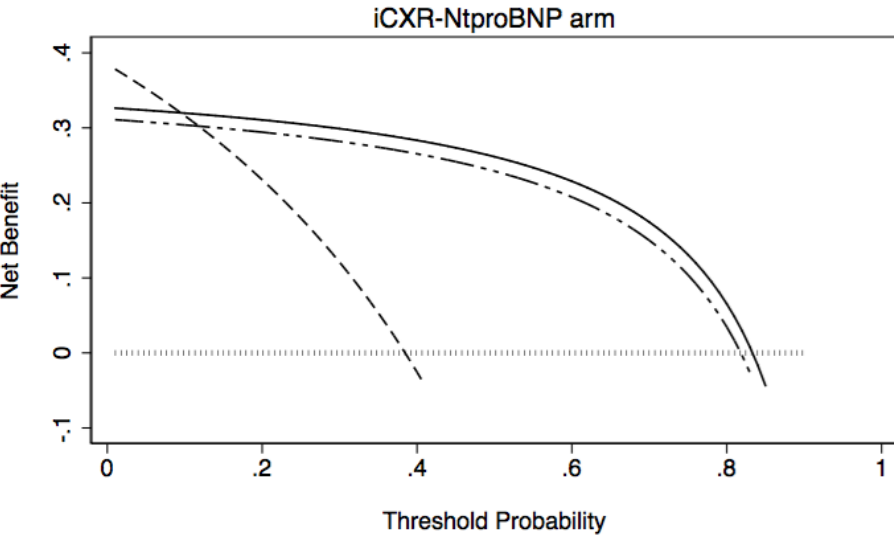


ROC - AUC
ACCURATEZZA

NRI e NB
CLINICAL USEFULNESS

Trial Randomizzato Controllato

CXR-NtproBNP IMPLEMENTED ARM		
	CXR-NtproBNP-implemented	
Events = ADHF		

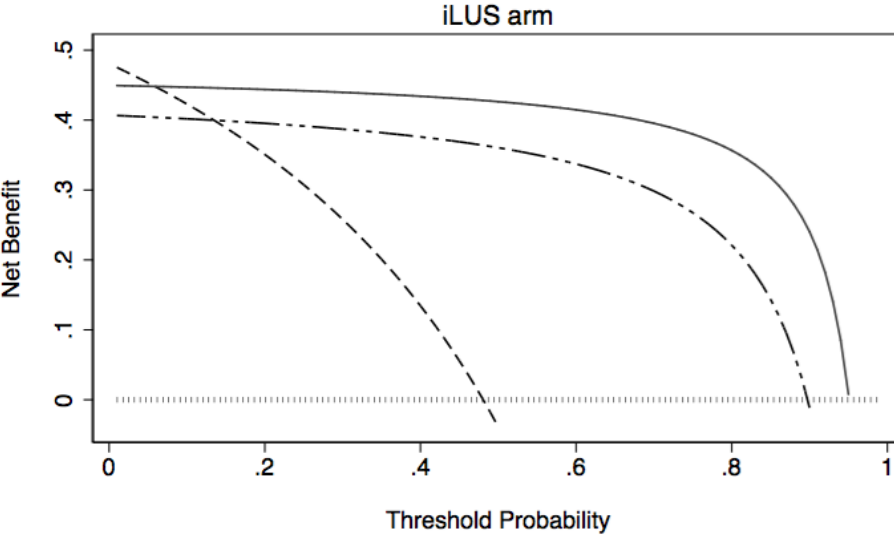


----- NB Treat All	 NB Treat None
-.-.-.- NB clinical ev.	———— NB integrated ev.

cardiac	143	17	160
ADHF	12	6	18
total	143	17	160

$$I_{\text{events}} = (12/160) - (6/160) = 0.6\%$$

LUS IMPLEMENTED ARM		
	LUS-implemented	
Events = ADHF		



----- NB Treat All	 NB Treat None
-.-.-.- NB clinical ev.	———— NB integrated ev.

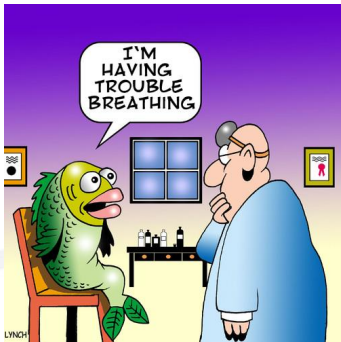
Clinical work-up	cardiac	128	6	134
	ADHF	9	3	12
	total	128	6	134

$$NRI_{\text{non-events}} = (9/134) - (3/134) = 4.5\%$$

Articolo in preparazione



Trial Randomizzato Controllato



Anamnesi+EO+ECG+EGA art

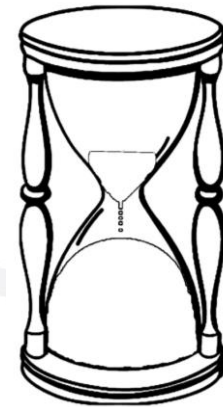


Randomizzazione



braccio eco

5 minuti



$p < 0.01$



braccio rx-
NTproBNP

104'30"

Articolo in preparazione

Take home ~~messages~~ provocation

- *l'approccio integrato clinica+eco polmonare è una metodica accurata e proponibile per la diagnosi differenziale dell'ADHF in DEA*
- *l'approccio integrato si è dimostrato anche più rapido e con una miglior clinical usefulness*
- *c'è interesse per la ricerca clinica in medicina d'urgenza?*

Pietro Tizzani presenterà i risultati
del trial nella sessione delle
presentazioni orali





Grazie dell'attenzione!

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