Clinical Case:

"My patient has heart failure, s.o.b., renal failure and diabetes: is CRT- D a therapeutic option?"

E. Gronda, MD, FESC

Clinical Cardiology and Heart Failure Unit

Cardiology Department

IRCCS Istituto Clinico Humanitas

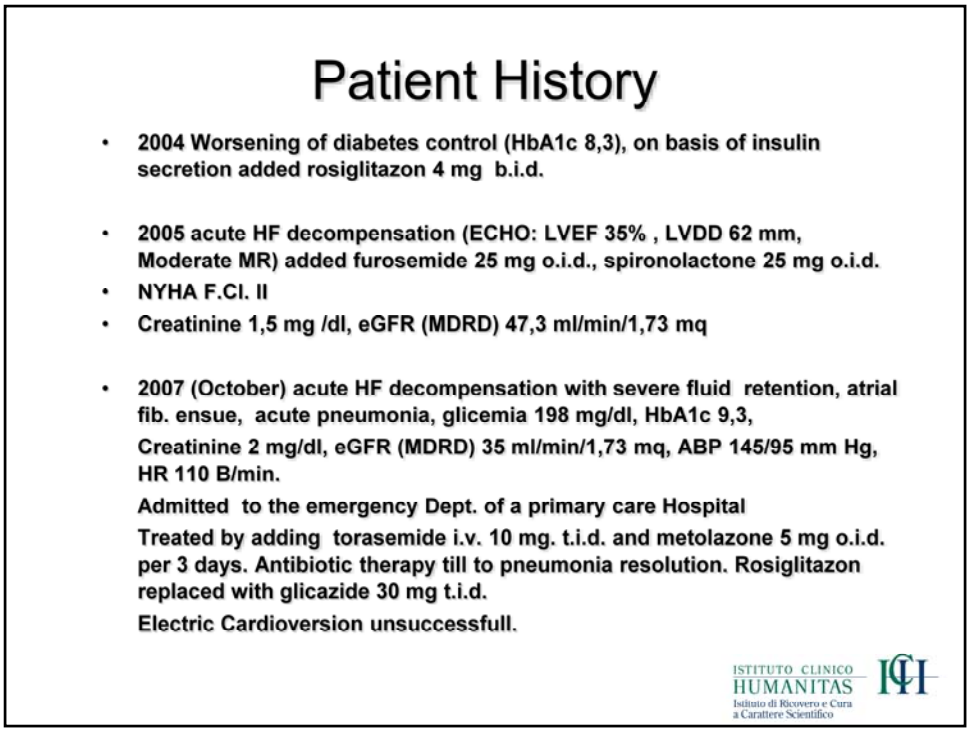
Rozzano - Milano

ISTITUTO CLINICO HUMANITAS
Istituto di Ricovero e Cura a Carattere Scientifico

Patient History

- 73y.o. Male, H 1,72 m, Kg 76, BMI 25,7
- History of untreated high blood pressure in the remote past
- Heavy smoker until 1987
- 1987 AMI (septal-inferior)
- 1987 CABG (4 venous grafts), Atenolol 50 mg o.i.d. added
- 1999 type 2 diabetes diagnosis, treated with diet.
- 2000 PAD (TEA left ICA) sinvastatin 20 mg o.i.d. added
- 2002 s.o.b. Detection at Echo of LVEF 45%, BP165/105 mm Hg. Started ACEI (enalapril 10 mg b.i.d. and hydroclorothiazide 12,5 mg o.i.d.).

ISTITUTO CLINICO HUMANITAS
Istituto di Ricovero e Cura a Carattere Scientifico



Worsening of heart failure was coupled with renal failure progression

Patient History

During in Hospital stay:

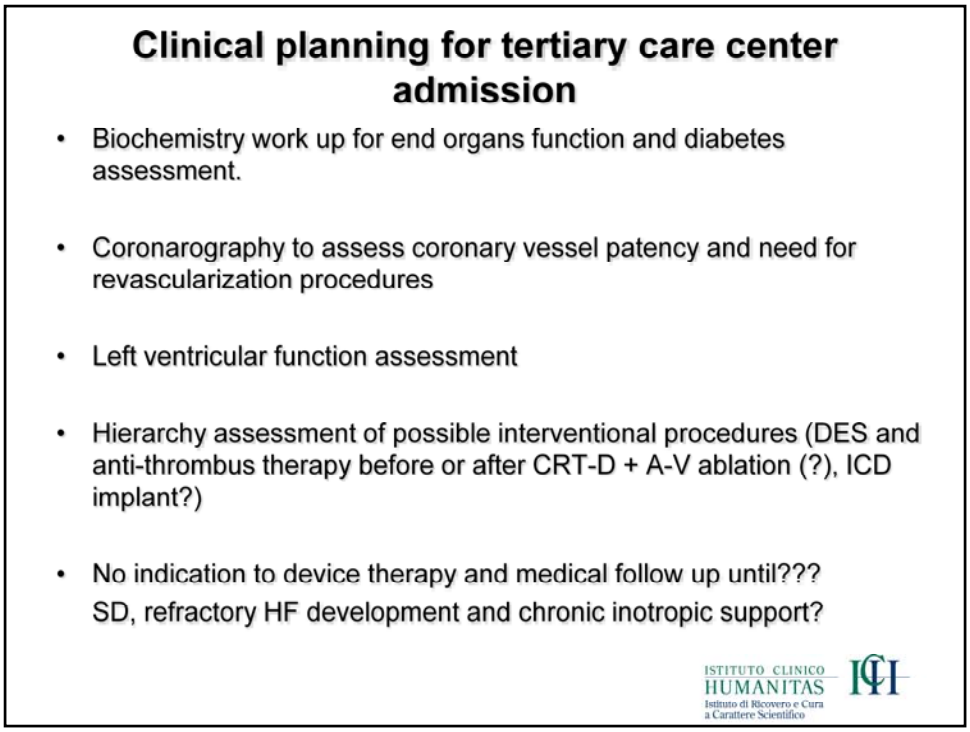
ECHO: LVEF 27% , LVDD 68 mm, Moderate-severe MR, LA a.p. diameter 51 mm, sPAP 65 mm Hg. Right ventricular hypo-kinesia, TAPSE 10.

ECG: AFib., HR 91, QRS width 98 msec, but LBBB heart rate dependent (QRS duration 130 msec).

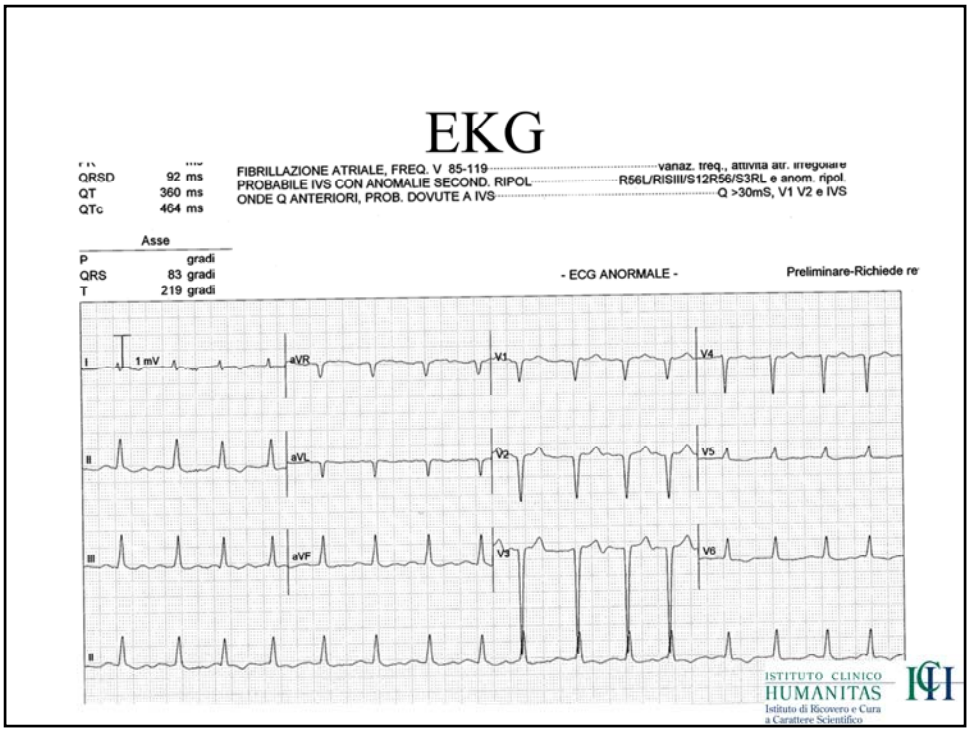
Rx: β-blocker therapy switched to carvedilol 12,5 mg twice a day torasemide 10 mg tbl. o.i.d. and metolazone 2,5 mg o.i.d., digoxin 0,125 mg o.id., spironolactone 25 mg o.i.d.

Planned Hospital admission to tertiary care Center for therapy reassessment.

ISTITUTO CLINICO HUMANITAS
Istituto di Ricovero e Cura a Carattere Scientifico

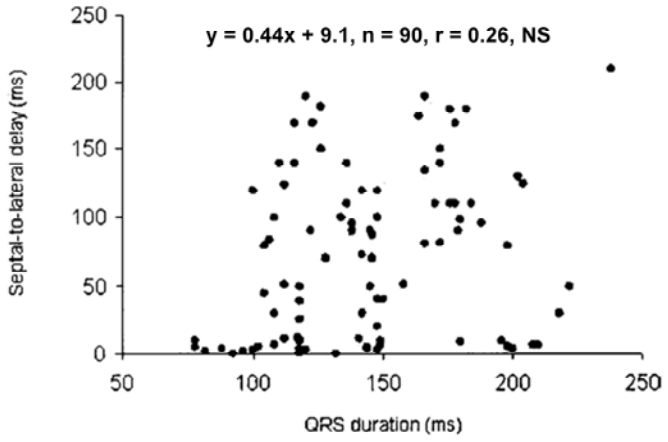


Complex clinical case having potential indication to different interventional procedures which had to be stated on the basis of clinical nee and to implications related to each single procedure



Atrial fibrillation with average heart rate 85 beats/min. Short QRS duration : 92 msec.

Relationship between septal-to-lateral delay and QRS duration in patients with end-stage HF

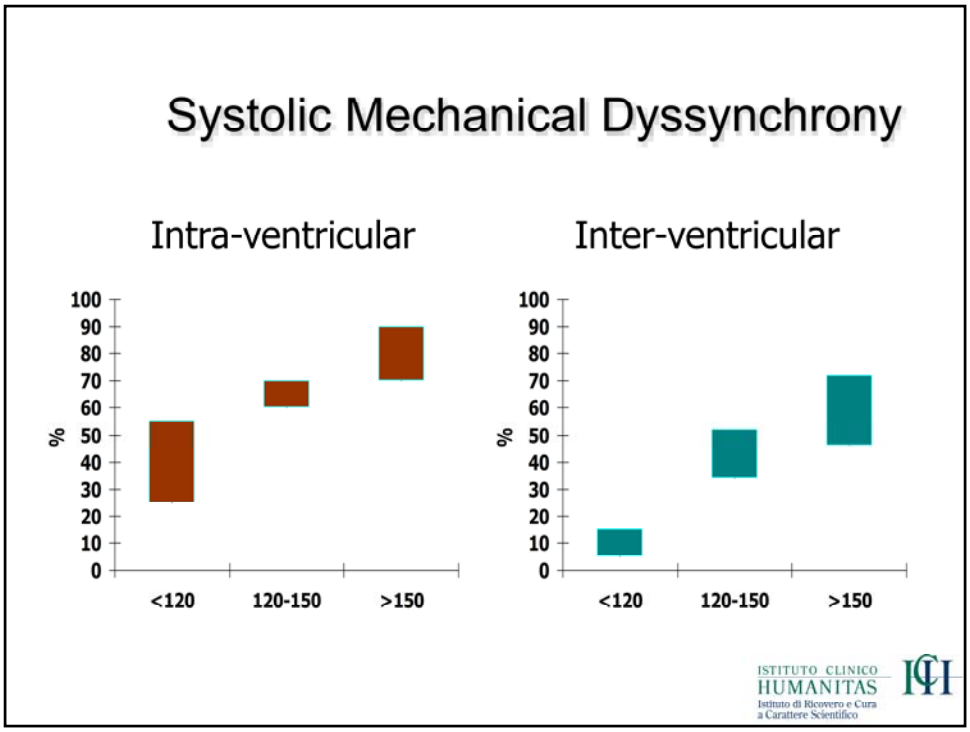


No significant relation existed between QRS duration and septal-to-lateral delay.

Bleeker GB, et al. J Cardiovasc Electrophysiol 2004;15:544

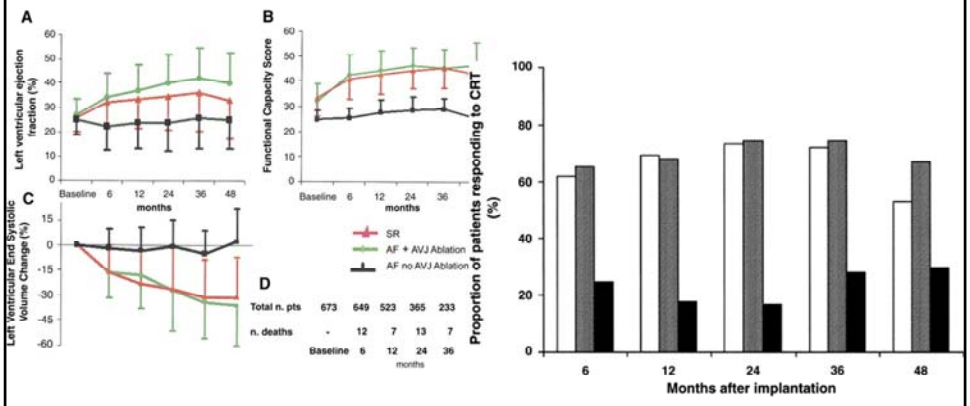
The presence of dyssynchrony is not much related to QRS width. Lack of relation between QRS duration and septal contraction delay.

.



Dyssynchrony is present in patients with narrow QRS.

Four-Year Efficacy of CRT on Exercise Tolerance and Disease Progression: The Importance of Performing Atrioventricular Junction Ablation in Patients With Atrial Fibrillation



Gasparini M et al J Am Coll Cardiol 2006;48:734–43)

Biochemistry assessment at H admission

- Urea 75 mg/dL
- Creatinine 1,6 mg/dL
- eGFR (MDRD) 43 ml/min/1,73 m^2
- Na^+ 137 mmol/L
- K^+ 4,4 mmol/L
- BNP 870 pg/ml
- Glic. 157 mg/dl
- HbA1c% 8
- Hb 12,5 gr, HT% 35, MCV 90
- Col. (total) 166, LDL 84, HDL 28 mg/dl
- Urine Alb./creat. 127 mg/g

ISTITUTO CLINICO HUMANITAS
Istituto di Ricovero e Cura a Carattere Scientifico

Clinical assessment at H admission

- Body Weight 69 kg, BSA 1,74 m^2
- NYHA f.cl. III
- BP 128/85 mm Hg, HR 78/SR, JVP (30° slope) 14 cm H2O
- Weak heart sounds, Mitral Regurgitation Murmur (1-2/6)
- Harsh breath sound and bilateral wheezes at chest listening
- Mild limb edema

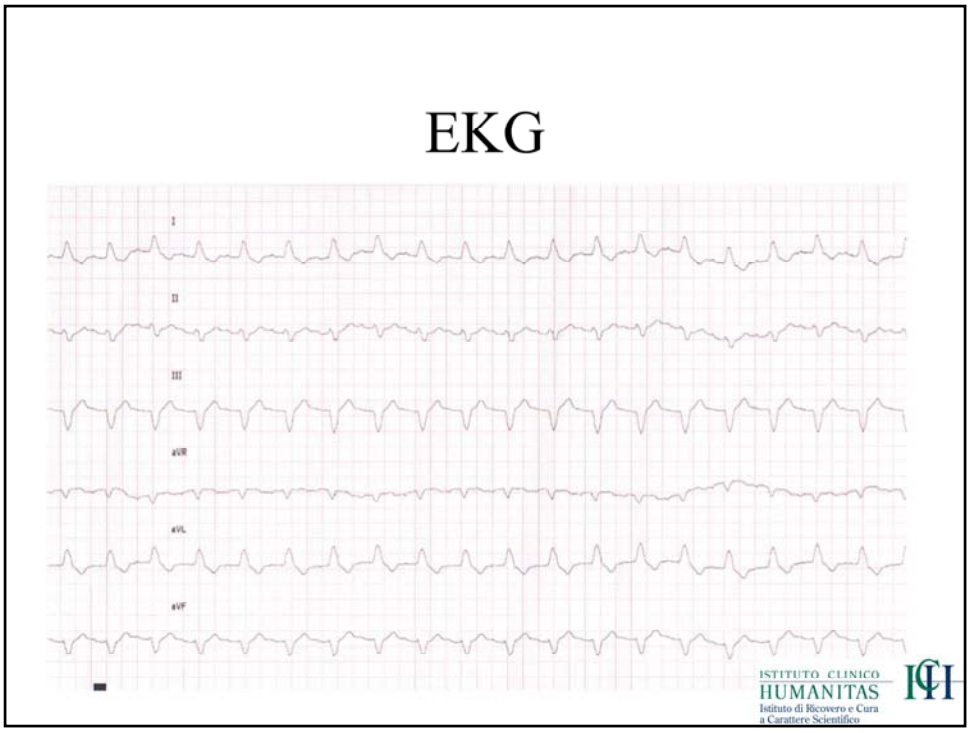
ISTITUTO CLINICO HUMANITAS

Chest X Ray

24 January '08

Chest X Ray: pulmonary venous congestion, interstital edema, Kerley B line
Therapeutic decision : Furosemide 40 mg e.v. bolus

ISTITUTO CLINICO HUMANITAS
Istituto di Ricovero e Cura a Carattere Scientifico



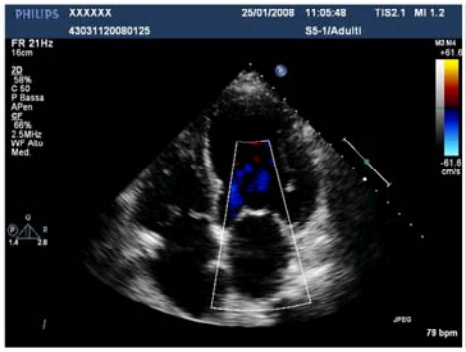
Sinus tachycardia with increased heart rate to 120 beats / min, QRS width up to 120 msec.

ECHOCARDIOGRAPHY

- EDD 70 mm
- Septum Th. 9 mm
- Posterior W. Th 9 mm
- L. Atr. Diameter 52 mm
- LV mass Ind. 144 g/m^2
- D.T. 106 msec
- Restrictive filling pattern
- Color Doppler M.R. 2+/4+

ISTITUTO CLINICO HUMANITAS
Istituto di Ricovero e Cura a Carattere Scientifico

ECHOCARDIOGRAPHY



ROA 0,22 cm^2

Restrictive filling pattern

ISTITUTO CLINICO HUMANITAS
Istituto di Ricovero e Cura a Carattere Scientifico

ECHOCARDIOGRAPHY

Color Doppler

- **Tricuspid Regurgitation**
- **TAPSE 8**

ISTITUTO CLINICO HUMANITAS
Istituto di Ricovero e Cura a Carattere Scientifico

In HF patients the right ventricular impairment coupled with relevant tricuspid incompetence is a powerful and independent indicator of adverse prognosis.

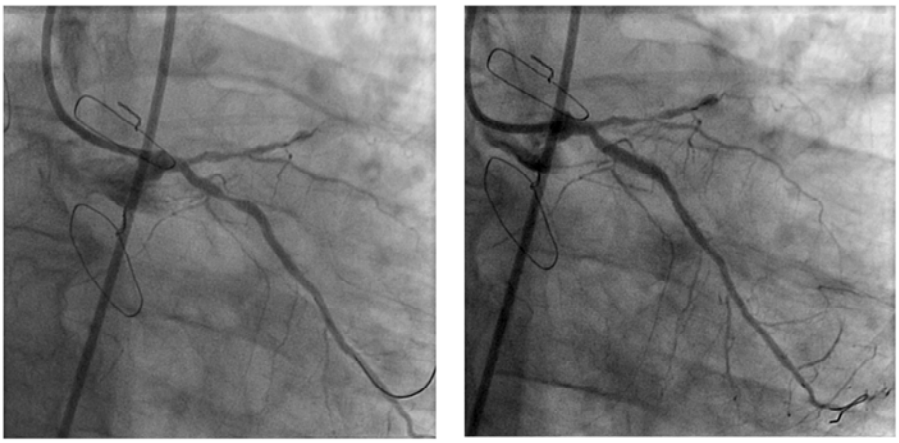
Right heart catheterization
4 February 2008

• Heart rate	98 (beats/min)
• Mean right atrial press. (mmHg)	16
• Pulmonary Pressure (Trunk) (mm Hg)	56/24 (average 38)
• Capill. Wedge Pressure (mm Hg)	26
• Cardiac Index (l/min/m2)	1,8
• Aortic Pressure (mm Hg)	98/68 mean 82

ISTITUTO CLINICO HUMANITAS
Istituto di Ricovero e Cura a Carattere Scientifico

PCI procedure

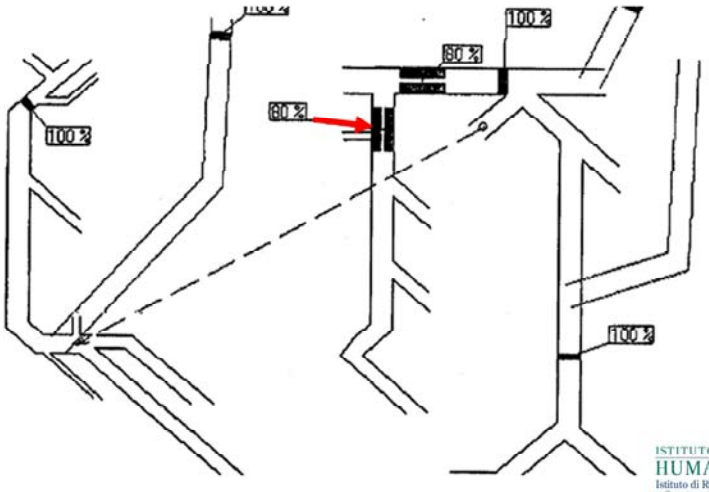
4 February 2008



During balloon inflation PAO dropped from 115 to 85 mm Hg

CORONAROGRAPHY

25 January 2008

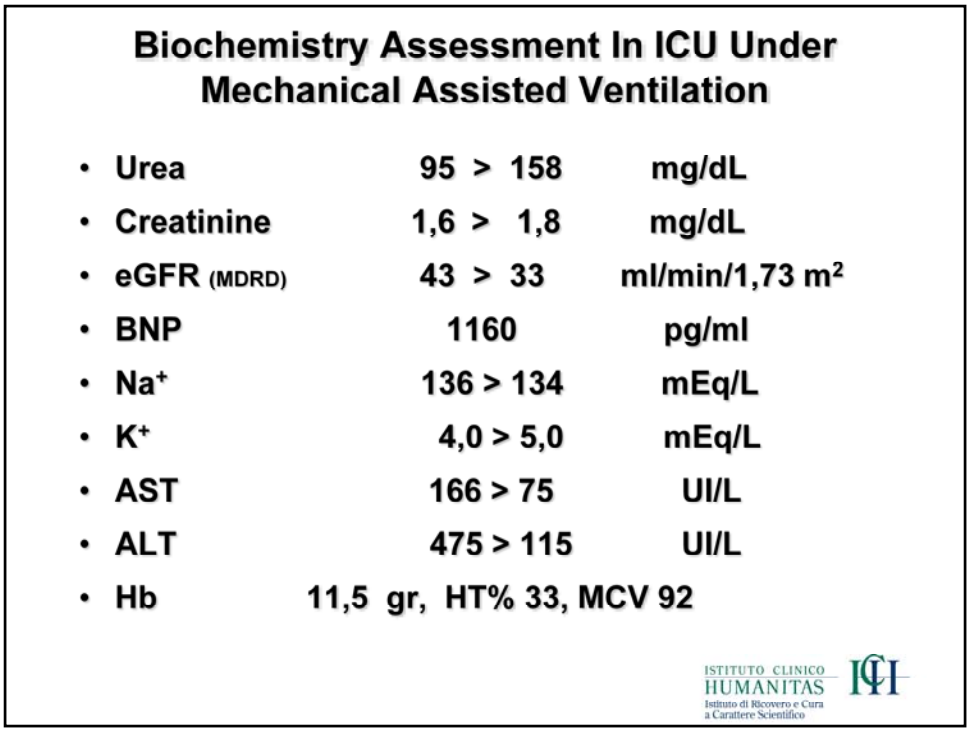


ISTITUTO CLINICO HUMANITAS
Istituto di Ricovero e Cura a Carattere Scientifico

Chest X Ray
25 January '08

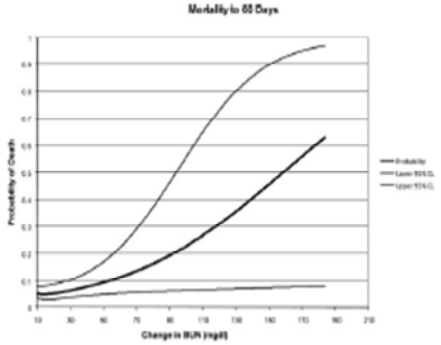
Admitted to Intensive Care Unit for acute pulmonary edema management

ISTITUTO CLINICO HUMANITAS
Istituto di Ricovero e Cura a Carattere Scientifico



By Increasing urine output hemodynamic stability was achieved, but renal function deteriorated indering patient outcome in the short and medium term follow up

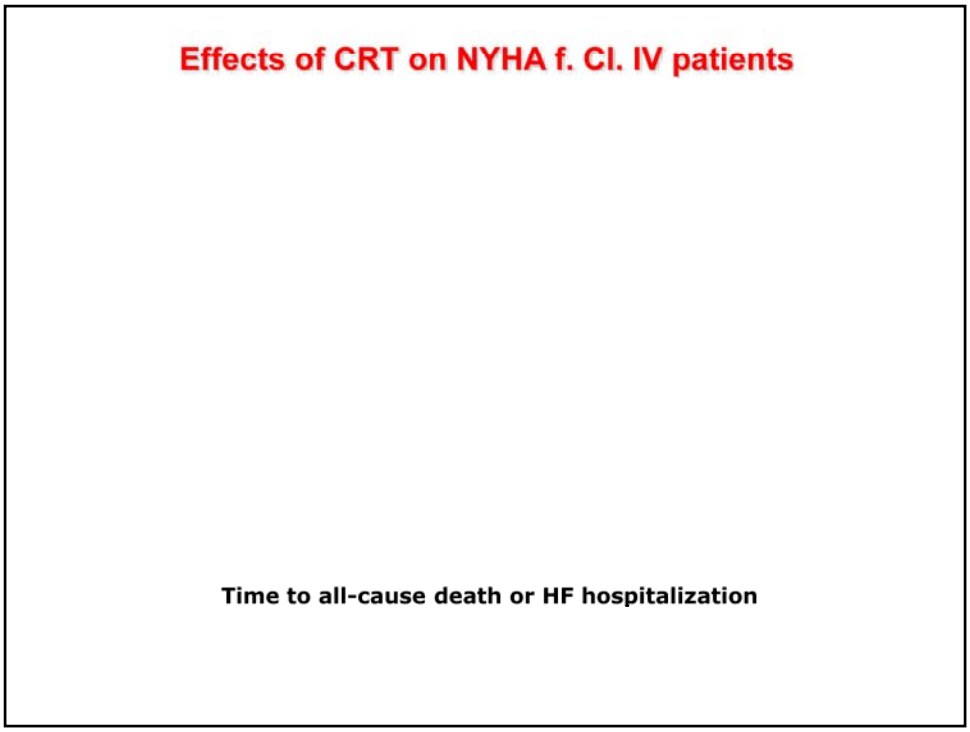
BUN Admission and Changes Predict 60 days outcome in AHF Pts



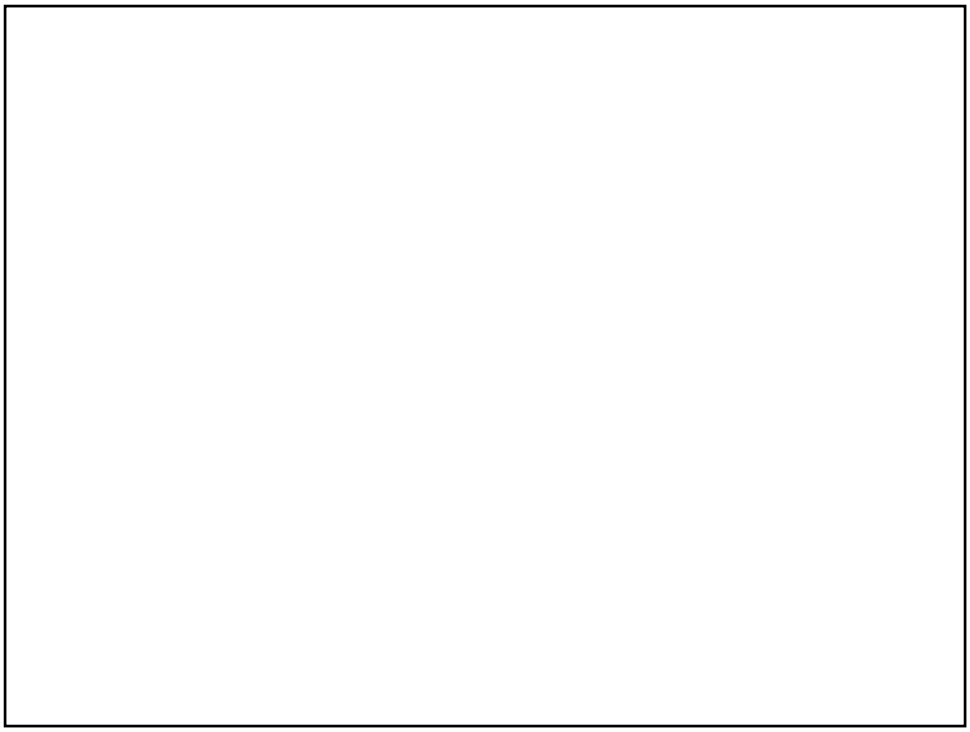
Baseline BUN and 60-day probability of death.

BUN changes and 60-day probability of death.

***Klein L et al. Circ Heart Fail*. 2008;1:25-33**



In NYHA Class IV patients CRT D does not provide superior benefit to CRT and prognsis at 1 year remains blick (more than 50% of patients experience adverse events)!



Conclusion

The baseline presence of important mitral regurgitation, with a ROA $\geq 0.20\ cm^2$, in patients with dilated cardiomyopathy who undergo CRT is associated with a lack of response in terms of reverse remodelling.

Clinical Decision

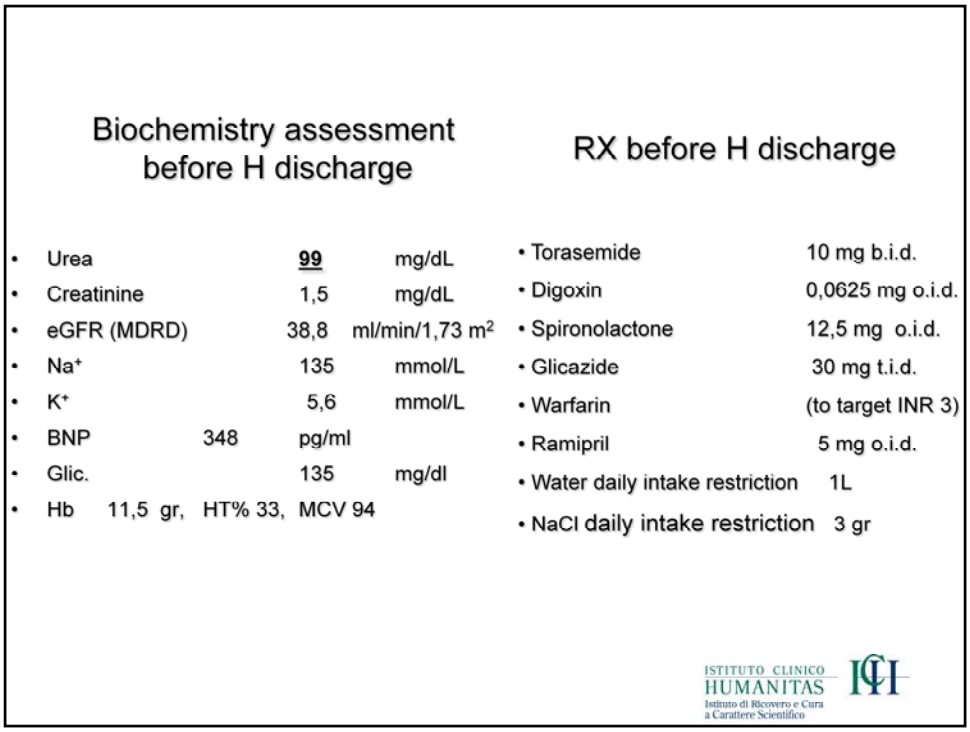
- CRT –D implant ruled out by the burden of age, ischemic HF etiology associated with other medical conditions (diabetes and renal failure) and by the presence of severe left systolic dysfunction coupled with relevant mitral regurgitation and right ventricular impairment.

- ICD implant not a primary need in a patient with progressive heart failure symptoms, despite optimized medical therapy.

- Treatment of proximal circumflex artery severe stenosis with PCI and DES, probably the most easy and appropriate therapeutic approach.

- Major limits of the therapeutic decision :
  - potentially inadequate
  - Could prevent or jeopardize further interventional device therapy for months.

ISTITUTO CLINICO HUMANITAS
Istituto di Ricovero e Cura a Carattere Scientifico



High urea level: major independent indicator of poor outcome in the short term follow up