The psychological impact
and burden of ICDs
Turin , october 20

The psychiatrist's point of view

Riccardo Torta
Clinical and Oncological Psychology
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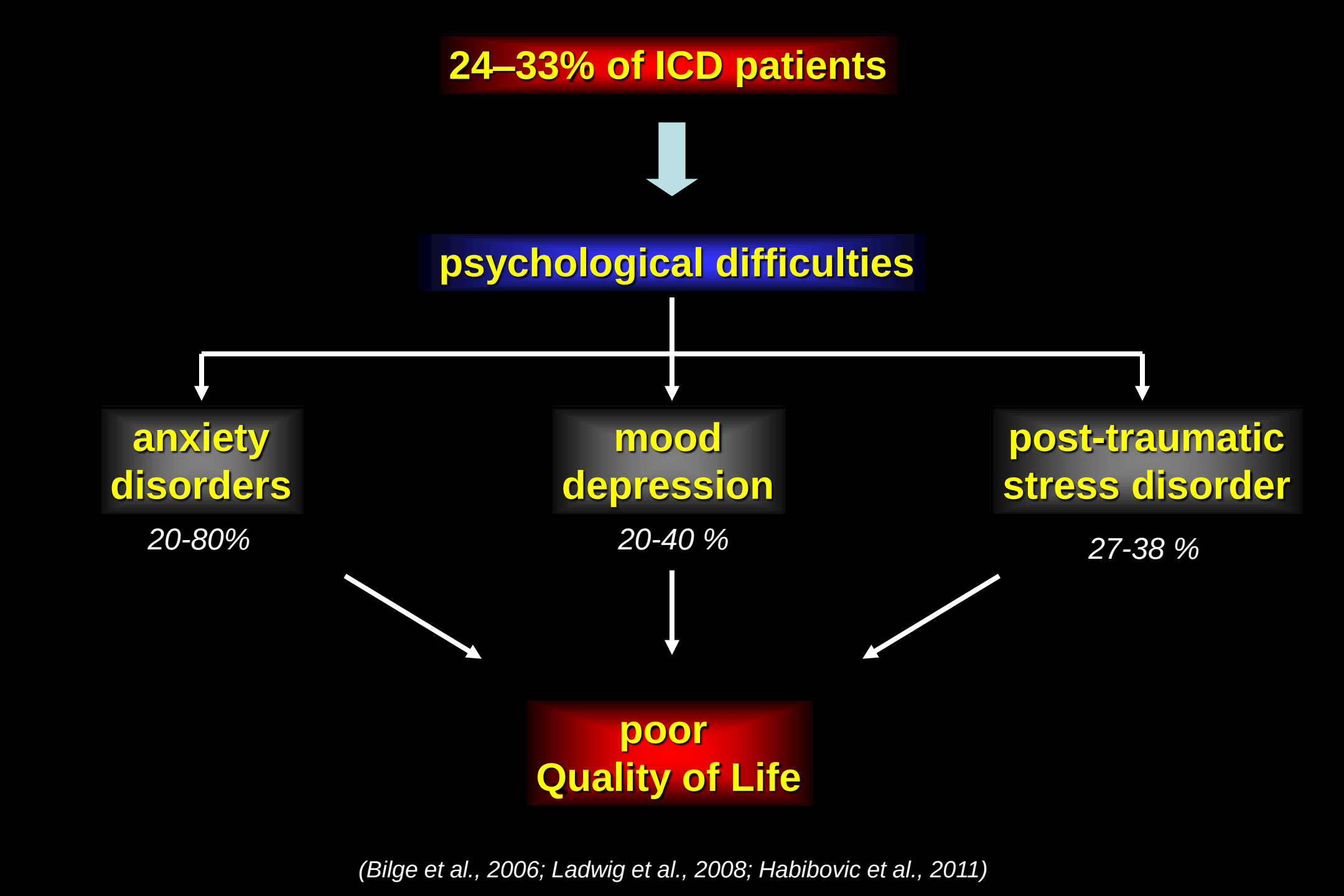
CLINICAL ASPECTS



(Bilge et al., 2006; Ladwig et al., 2008; Habibovic et al., 2011)

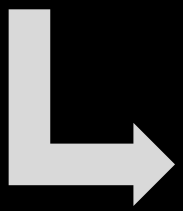
Risk factors as markers for psychosocial attention

ICD specific

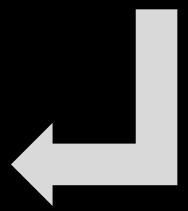
Younger ICD recipient
(age < 50 years)
Poor understanding
(about pathology and ICD)
High rate of device discharges
("ICD storm")
Medical severity or comorbidity
(diabetes)

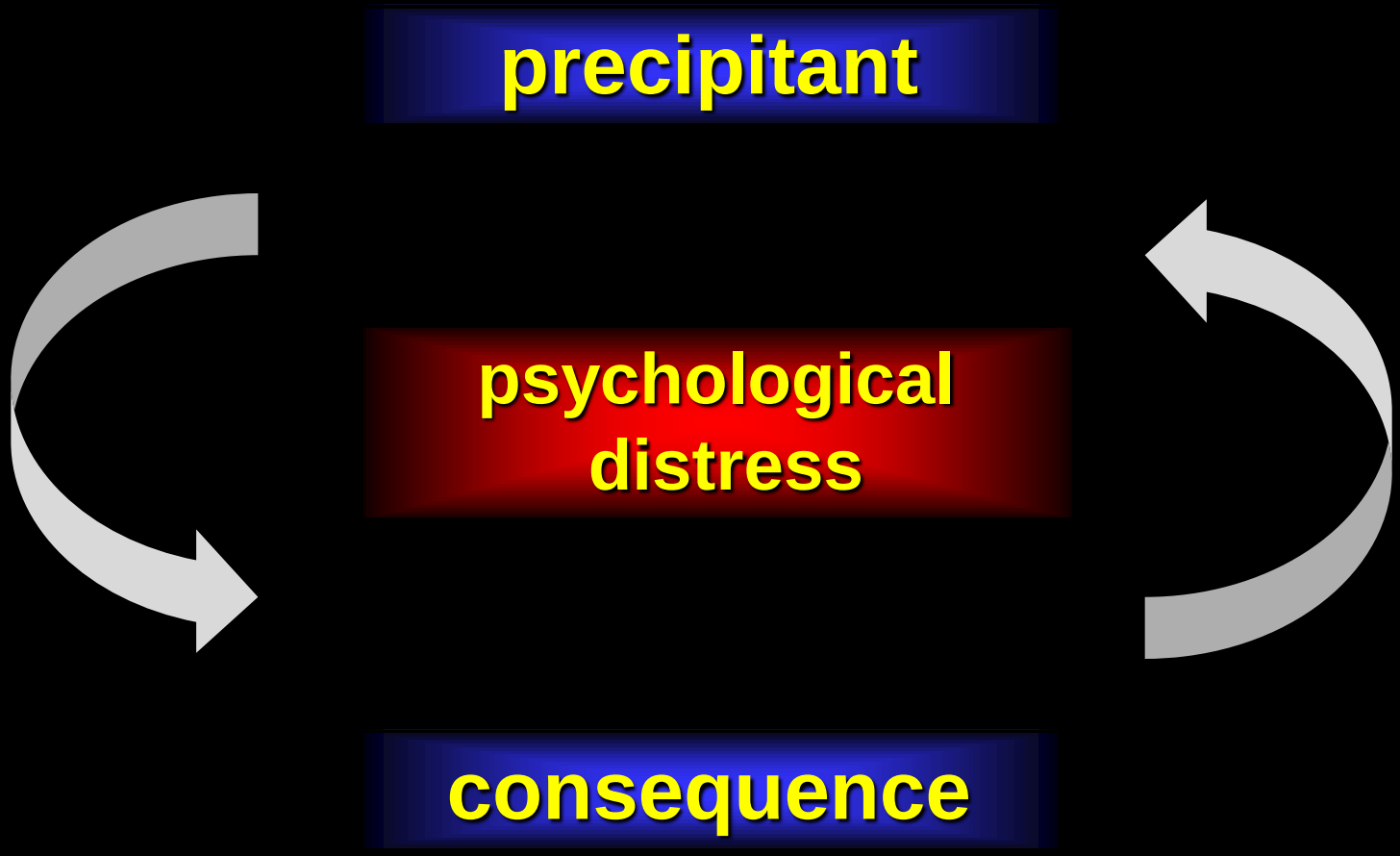
Patient related

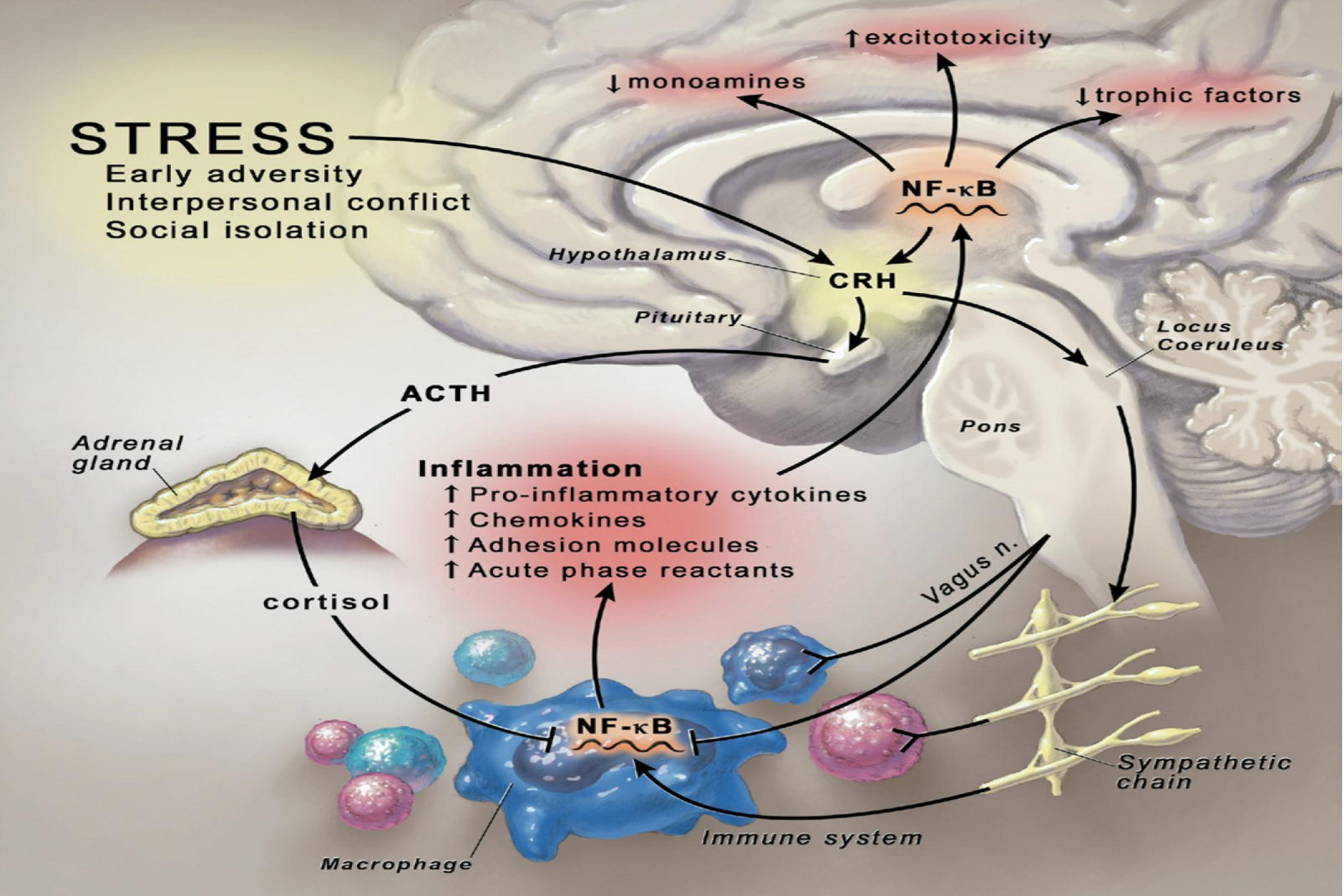
History of emotional problems
(mood depression, anxiety)
Poor social support
(as perceived or family fears)
Female gender
(stress and pain sensitivity)
Type D personality
(alexytimia)



psychological distress
and deterioration in QoL



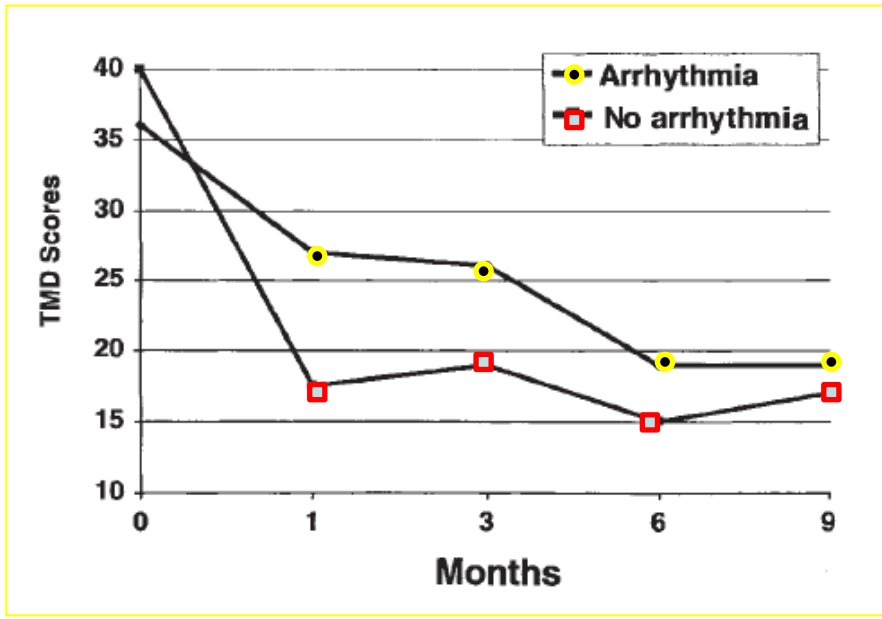

precipitant
psychological distress
consequence


↑excitotoxicity
↓monoamines
↓trophic factors
STRESS
Early adversity
Interpersonal conflict
Social isolation
NF-κB
Hypothalamus
CRH
Pituitary
Locus Coeruleus
ACTH
Pons
Adrenal gland
Inflammation
↑ Pro-inflammatory cytokines
↑ Chemokines
↑ Adhesion molecules
↑ Acute phase reactants
cortisol
Vagus n.
NF-κB
Sympathetic chain
Immune system
Macrophage

ASSOCIATION OF MOOD DISTURBANCE AND ARRHYTHMIA EVENTS IN PATIENTS AFTER CARDIOVERTER DEFIBRILLATOR IMPLANTATION

DEPRESSION AND ANXIETY 9:163–168 (1999)

Sandra B. Dunbar, R.N., D.S.N.,[1*] Laura P. Kimble, R.N., Ph.D.,[1] Louise S. Jenkins, R.N., Ph.D.,[2] Mary Hawthorne, R.N., Ph.D.,[3] William Dudley, Ph.D.,[4] Marina Slemmons, R.N., Ph.D.,[1] and Jonathan J. Langberg, M.D.[5]



moderate to severe depression among 645 patients with ICDs was associated with a **3.5-fold risk** of experiencing ICD shocks.

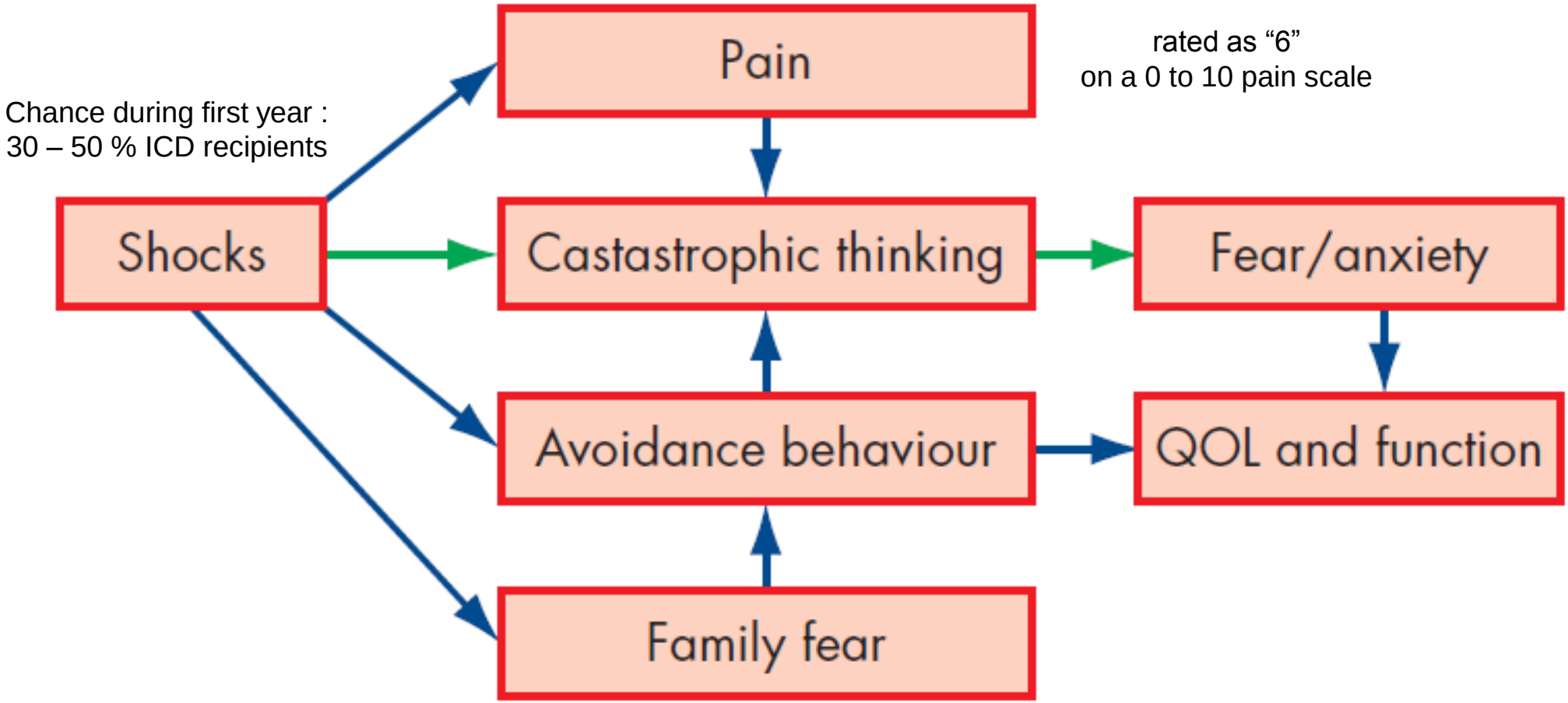
Hypothesized mechanisms:
neuroendocrine activation (from mental stress and anger), myocardial ischemia,and platelet dysfunction (Furukawa et al., 1989; Ironson et al., 1992)

Anxiety and tension, heightens sympathetic arousal and imbalances between the sympathetic and parasympathetic systems which mediates an arrhythmogenic environment [Goldberg et al., 1996)

Patients with catastrophic thinking have high anxiety scores and interpret bodily symptoms as signs of danger for sudden death

Samuel F Sears Jr, Jamie B Conti

Heart 2002;**87**:488–493

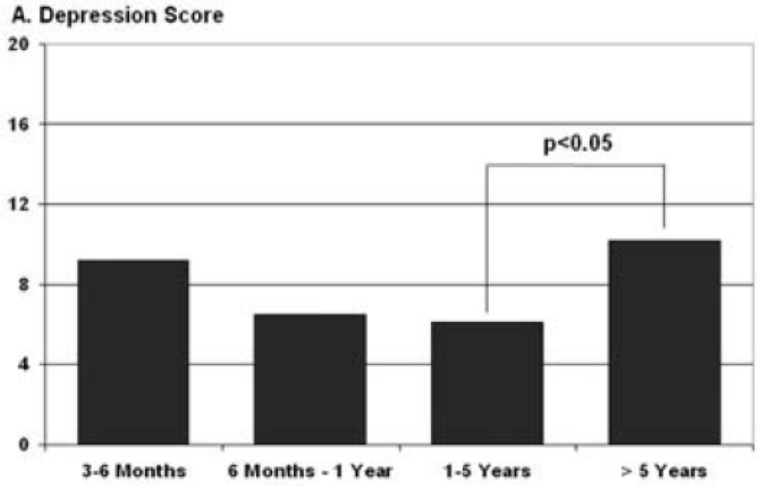


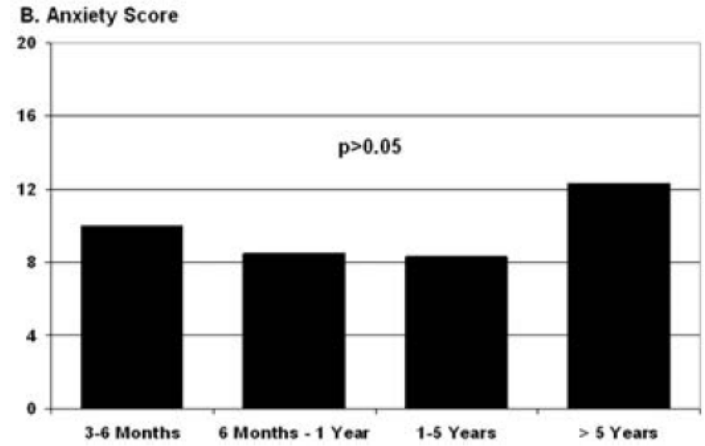
Harm avoidance and adherence to treatments

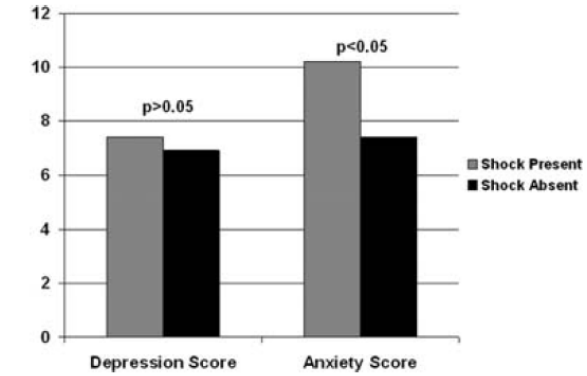
Depression and Anxiety Status of Patients with Implantable Cardioverter Defibrillator and Precipitating Factors

AHMET KAYA BILGE,* BESTE OZBEN,* SABRI DEMIRCAN,† MUTLU CINAR,* ERCUMENT YILMAZ,* and KAMIL ADALET*

PACE 2006; 29:619–626







HADS : 46% anxiety and 41% depression

In female patients, depression and anxiety scores were found significantly higher compared to male patients (P = 0.046 and P = 0.016, respectively).

Posttraumatic Stress Symptoms and Predicted Mortality in Patients With Implantable Cardioverter-Defibrillators

Arch Gen Psychiatry. 2008;65(11):1324-1330

Karl-Heinz Ladwig, PhD, MD; Jens Baumert, PhD; Birgitt Marten-Mittag, PhD; Christof Kolb, MD; Bernhard Zrenner, MD; Claus Schmitt, MD

PTSD is characterized by intense fear, leading to the persistence of painful intrusive memories, avoidance behavior, and hyperarrousal

Table 4. Mortality Rates by Age Class and by Posttraumatic Stress Disorder (PTSD) Level in the Study Population

PTSD Level	Deaths, No. (%)	Total No.	Follow-up Period, y	Person-Years	Mortality Rate per 1000 Person-Years
Age ≤60 y					
Low or moderate	5 (12.8)	39	5.9	230.0	21.7
High	5 (21.7)	23	4.7	108.0	46.3
Age >60 y					
Low or moderate	27 (38.6)	70	5.0	349.7	77.2
High	8 (53.3)	15	3.7	55.0	145.5
Total	**45** (30.6)	**147**	5.1	**742.7**	60.6

Table 5. Effect of Posttraumatic Stress Disorder (PTSD) Symptoms on Mortality Risk Estimated by Cox Proportional Hazards Regression Models With Different Adjustments

Model and Adjustment	Hazard Ratio (95% Confidence Interval)[a]	*P* Value	Area Under the Curve	Hosmer-Lemeshow Goodness-of-Fit Test
Age, sex, survey	. . .	. . .	0.75	12.4
Model 1: age, sex, survey, PTSD	2.44 (1.24-4.80)	.01	0.76	6.1
Model 2: multivariate, PTSD[b]	3.21 (1.56-6.62)	.002	0.83	6.1
Model 3: multivariate, PTSD[c]	3.45 (1.57-7.60)	.002	0.83	9.9

substantial overlap between PTSD, depression, and anxiety.

2004 Blackwell Publishing Ltd, *Journal of Clinical Nursing*, 13, 194–200

The effects of age on quality of life in implantable cardioverter defibrillator recipients

G. A. Hamilton and D. L. Carroll

SF 36 Higher score: better physical and mental health.

		Mean scores and SD ± by time				
Summary scores*	*n*	T1-baseline	T2-6 months	T3-12 months	*F*	*P*
Physical health						
Young	27	47.1 ± 9.4	46.1 ± 9.3	46.3 ± 10.2	4.05	0.03
Old	30	38.1 ± 10.3	44.4 ± 10.2	41.3 ± 12.2		
Mental health						
Young	27	44.6 ± 13.4	49.2 ± 9.9	50.0 ± 12.5	2.2	n.s.
Old	30	49.4 ± 9.6	50.9 ± 9.0	49.4 ± 11.1		

older age group:
less physically active,
less satisfied with their physical functioning,
persistent anxiety at 6 and 12 months

POMS Higher score: more anxiety and depression.

		Mean scores and SD ± by time				
POMS	*n*	T1-baseline	T2-6 months	T3-12 months	*F*	*P*
Anxiety						
Young	29	7.8 ± 5.1	3.1 ± 3.5	3.7 ± 4.5	19.19	0.0001
Old	29	4.8 ± 4.5	3.2 ± 3.2	3.9 ± 4.0		
Depression						
Young	29	4.4 ± 4.7	2.2 ± 2.6	2.6 ± 3.8	1.43	n.s.
Old	29	3.2 ± 3.4	2.2 ± 2.7	2.7 ± 3.6		

younger age group :
higher improvement of anxiety
and physical adjustment over time

Gender disparities in anxiety and quality of life in patients with an implantable cardioverter–defibrillator

Europace
doi:10.1093/europace/eur252

Mirela Habibović[1], Krista C. van den Broek[1], Dominic A.M.J. Theuns[2], Luc Jordaens[2], Marco Alings[3], Pepijn H. van der Voort[4], and Susanne S. Pedersen[1,2]*

Table 2 Influence of gender on anxiety and quality of life (multivariate analysis of covariance for repeated measures)

	physical functioning	SF	RP	RE	MH	vitality	BP	GH	Anxiety
	F	*F*	*F*	*F*	*F*		*F*	*F*	*F*
Time	3.07	1.03	5.14§	4.66§	11.36§	0.64	2.61	2.75	2.42
Gender	7.14§	0.73	1.50	0.88	0.25	4.88§	2.65	0.20	2.67
Age	1.46	8.12§	2.32	7.74§	3.10	8.39§	1.10	14.12‖	7.85§
Marital status (yes)	0.12	0.11	0.15	1.58	0.00	1.64	0.86	0.60	0.00
Smoking	3.44	3.45	2.28	3.30	3.31	7.08§	2.05	4.06§	3.91§
Education (low)	10.71‖	1.92	9.82#	17.84#	12.67‖	13.04‖	5.31§	2.58	18.81#
Working status (yes)	16.28#	14.88#	13.54‖	19.76#	0.01	5.05§	2.84	12.69‖	10.14‖
Site of implantation	0.93	4.56§	0.38	1.41	5.08§	4.55§	0.38	0.91	1.93
Indication	0.10	0.00	0.01	0.00	0.11	0.53	0.20	0.38	0.46
CAD[a]	1.36	0.66	2.01	0.43	0.38	0.06	3.06	5.14§	0.23
CRT[b]	10.80‖	0.35	11.06‖	2.89	4.15§	14.82#	0.01	11.99‖	1.46
Shocks[c]	0.08	0.88	1.35	0.65	0.15	0.09	0.02	0.97	2.47
Diabetes	17.23#	9.86§	10.14§	9.72§	0.93	11.77§	6.79	14.97‖	5.17§
Type D personality	10.70‖	33.72#	15.67#	34.08#	122.96#	35.76#	9.07‖	45.16#	152.47#
Psychotropics	13.70#	22.49#	12.08§	8.98§	38.02#	21.77#	27.59#	12.55§	26.23#
ACE-inhibitors	0.08	1.79	0.32	0.44	4.34§	0.28	3.13	0.14	0.19
Amiodarone	1.99	2.32	0.06	0.05	0.20	0.97	0.45	0.89	1.22
Beta-blockers	0.26	0.08	2.76	0.27	0.41	0.07	0.17	4.32§	0.23
Digoxin	0.30	1.80	0.15	0.00	0.58	0.58	1.48	2.61	2.30
Diuretics	22.38#	10.70‖	11.55‖	1.75	0.23	9.57‖	4.30§	10.94‖	1.13
Statins	0.12	1.80	0.19	1.30	0.00	0.00	0.36		

§P , 0.05; ||P , 0.01; #P , 0.001.

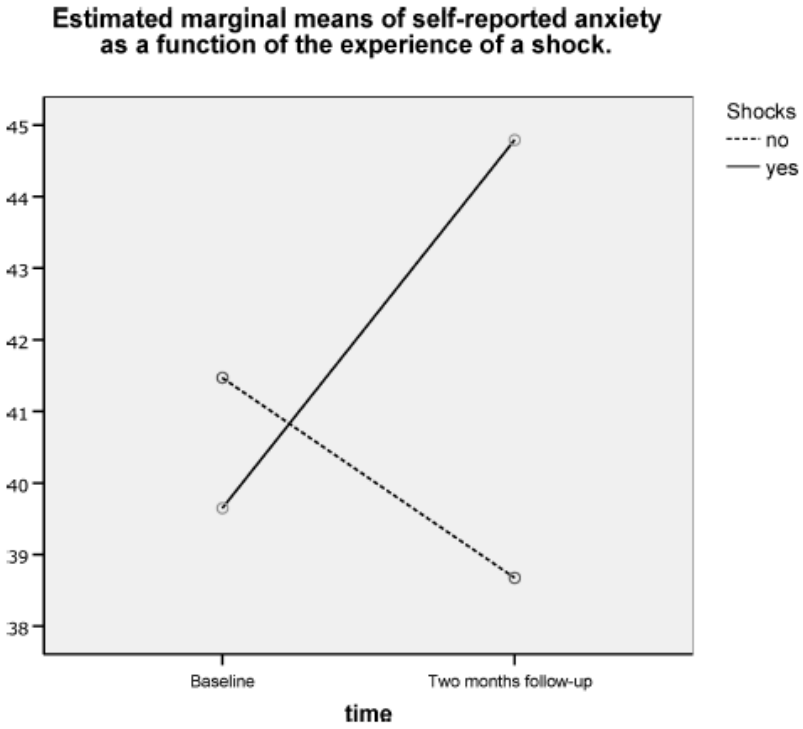
PF, Physical Functioning; SF, Social Functioning; RP, Role Physical Functioning; RE, Role Emotional Functioning; MH, Mental Health; VT, Vitality; BP, Bodily Pain; GH, General Health.

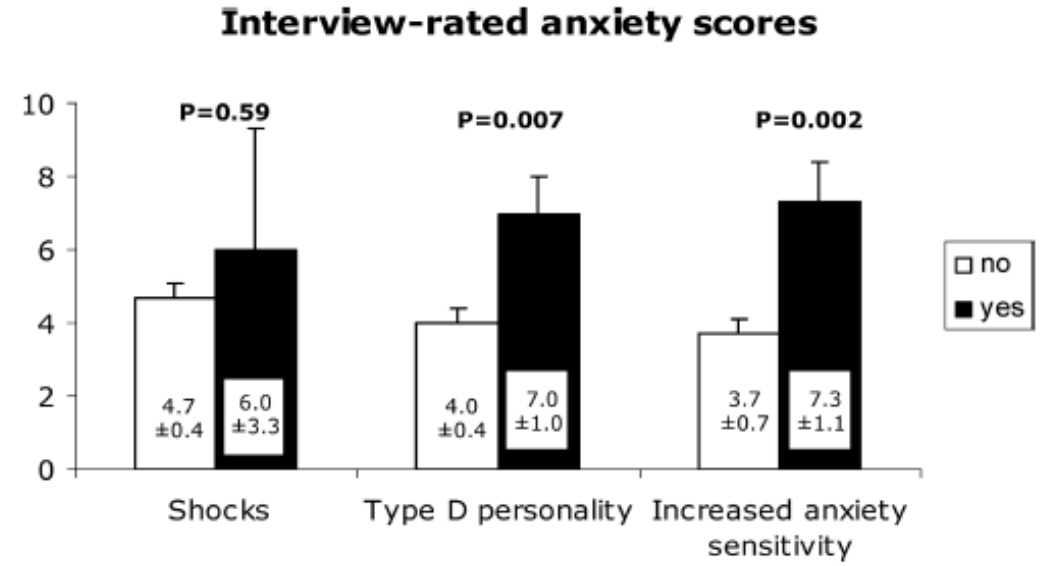
Shocks, Personality, and Anxiety in Patients with an Implantable Defibrillator

PACE 2008; 31:850–857

KRISTA C. VAN DEN BROEK, M.A.,* IVAN NYKLÍČEK, PH.D.,* PEPIJN H. VAN DER VOORT, M.D.,† MARCO ALINGS, M.D., PH.D.,‡ and JOHAN DENOLLET, PH.D.*

Type D personality	**DS14**	**Tendency to experience negative emotions and to inhibiti self-expression**
Anxiety sensitivity	**ASI**	**Tendency to be sensitive to and afraid of anxiety symptoms**





THERAPEUTIC APPROACHES

FAST SCREENING

scale	parameters	subscales
HADS	Anxiety depression	7+7 items (rated 0-3)
FPAS	ICD acceptance	positive appraisal body image deviced related distress return to function
FSAS	Shock-related anxiety	consequence factor trigger factor

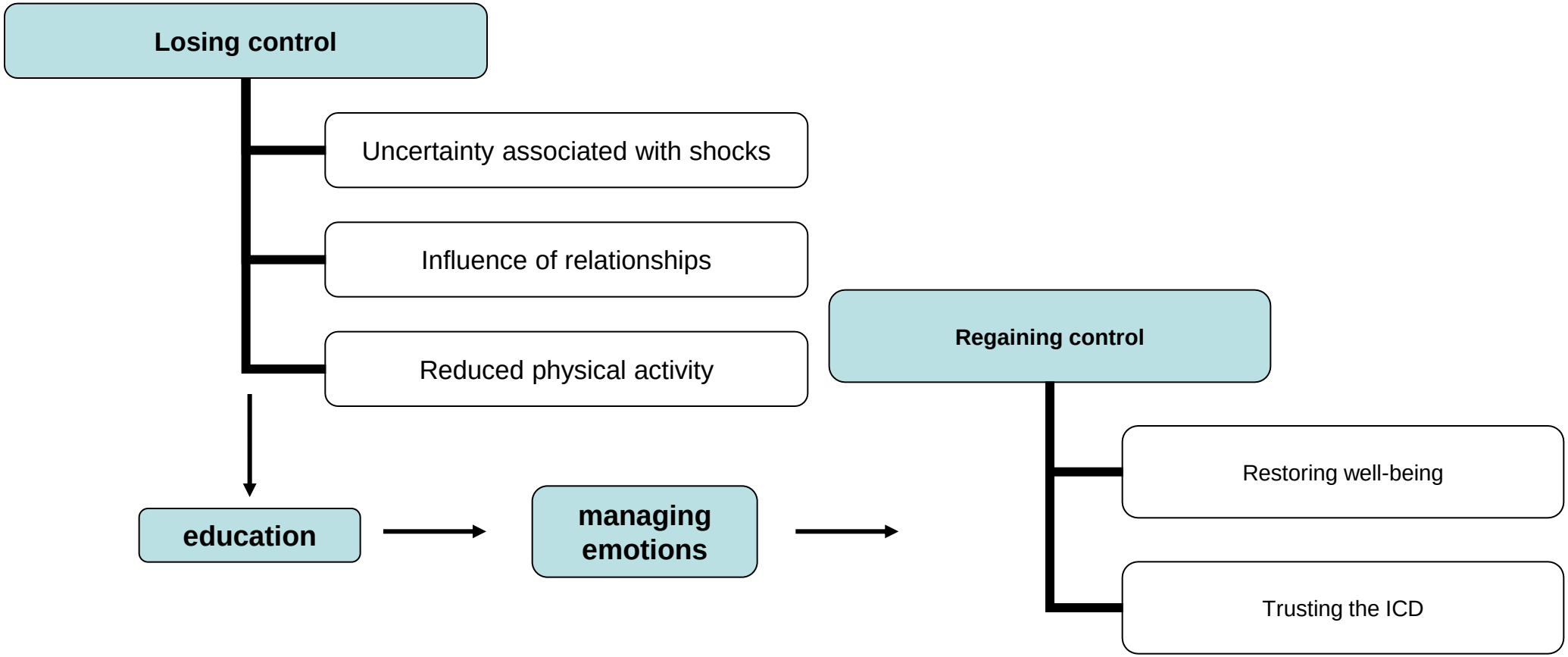
HADS Hospital Anxiety Depression Scale ; FPAS Florida Patient Acceptance Survey; FSAS Florida Shock Anxiety Scale

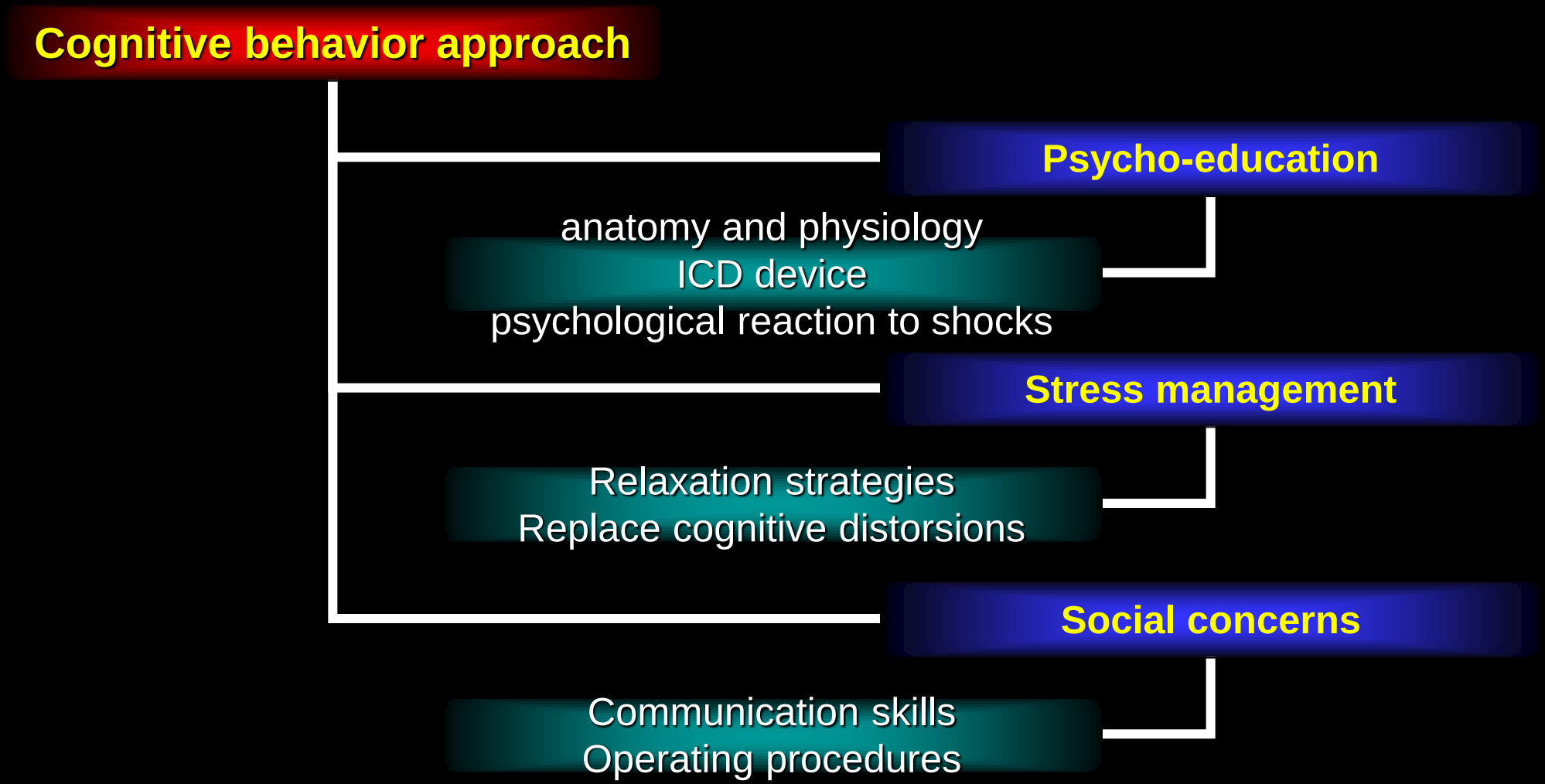
JCN Journal of Clinical Nursing

Reconstructing unpredictability: experiences of living with an implantable cardioverter defibrillator over time

Ingvild Margreta Morken, Elisabeth Severinsson and Bjørg Karlsen

2009 Blackwell Publishing Ltd, *Journal of Clinical Nursing*, 19, 537–546

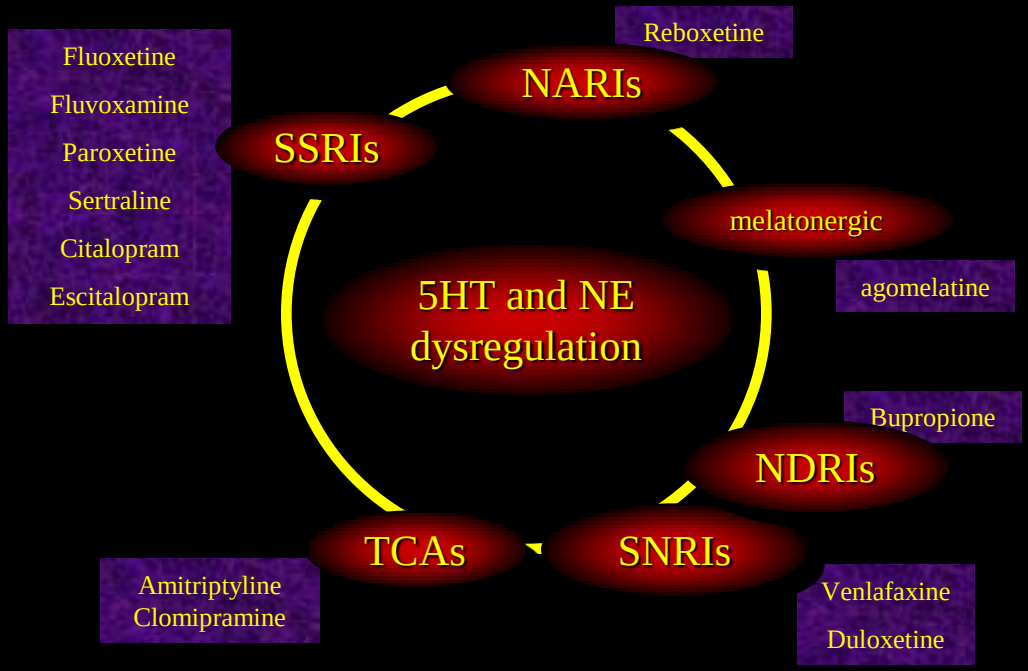




from Hirsh et al., 2009 mod.

Serotonergic activity has been related to the pathophysiology of heart failure (HF) and arrhythmogenesis

Jaffré et al. Circulation 2004; 110:969–974.



SSRIs effectiveness on:
functional capacity,
neurohumoral biomarkers,
and psychiatric symptoms
in patients with IHD and depression.

Sheline et al. Am J Med 1997; 102:54–59.
Lesperence et al. JAMA 2007; 297:367–379.
Rivelli and Jiang Curr Opin Cardiol 2007; 22:286–291.
O'Connor et al. Arch Intern Med 2008; 168:2232–2237.

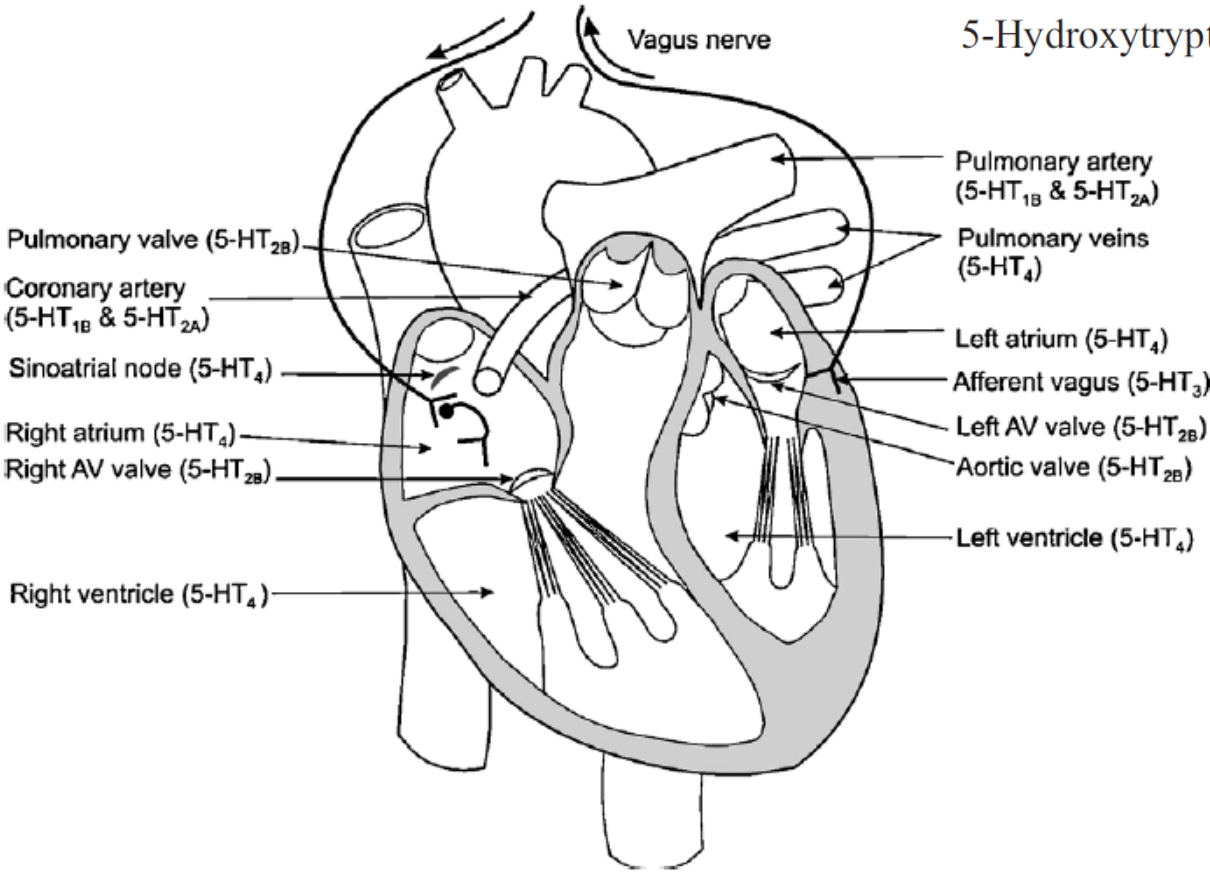
SSRIs may reduce the likelihood of arrhythmias

Kuijpers et al. Gen Hosp Psychiatry 2002; 24:181–184.
Shiravama et al. Am J Cardiol 2006; 97:1749–1751.

5-Hydroxytryptamine receptors in the human cardiovascular system

Alberto J. Kaumann [a,*], Finn Olav Levy [b,c]

Pharmacology & Therapeutics 111 (2006) 674–706



Functional effects mediated through the different 5-HT receptors in the human cardiovascular system

5-HT receptor	Human cardiovascular function	References
5-HT_{1A}	Renal vascular dilation?	Verbeuren et al., 1991
5-HT_{1B}	Vasoconstriction	Kaumann et al., 1993
	Cerebral arteriolar dilation	Elhusseiny & Hamel, 2001
5-HT_{1D}	Vascular nerve endings?	Verheggen et al., 1998, 2004
5-HT_{1E}	Unknown	
5-HT_{1F}	Unknown	
5-HT_{2A}	Vasoconstriction	Kaumann et al., 1993
	Platelet aggregation	De Clerck et al., 1984
5-HT_{2B}	Valvulopathy	Fitzgerald et al., 2000
	Vasodilation?	Glusa & Pertz, 2000
	Embryology?	Nebigil et al., 2000a
	Pulmonary hypertension?	Launay et al., 2002
5-HT_{2C}	Unknown	
5-HT_{3A}/	Reflex bradycardia?	Mohr et al., 1987
5-HT_{3B}	Pain?	Fu & Longhurst, 2002
5-HT_{4}	Cardiostimulation	Kaumann & Sanders, 1998
		Brattelid et al., 2004a, 2004b
	Pulmonary vein dilation?	Cocks & Arnold, 1992
5-HT_{5A}	Unknown	
5-HT_{6}	Unknown	
5-HT_{7}	Vascular relaxation?	Schoeffter et al., 1996

The Role of the Selective Serotonin Re-Uptake Inhibitor Sertraline in Nondepressive Patients with Chronic Ischemic Heart Failure: A Preliminary Study

DIONYSSIOS LEFTHERIOTIS, M.D.,* PANAYOTA FLEVARI, M.D.,*
IGNATIOS IKONOMIDIS, M.D.,* ATHANASIOS DOUZENIS, M.D.,†
CHRISOVALANDIS LIAPIS, M.D.,* IOANNIS PARASKEVAIDIS, M.D.,*
EFSTATHIOS ILIODROMITIS, M.D.,* LEFTERIS LYKOURAS, M.D., PH.D.,*
and DIMITRIOS TH. KREMASTINOS, M.D., PH.D.*

PACE 2010; 33:1217–1223

demographics Age (years) 62 ± 13 65 ± 15 Male/female ratio 22/6 22/4 NYHA class I :32% / 34% NYHA class II 68% /66%		**Initial evaluation**		**Follow-up (12 months)**	
		Sertraline group	**Control group**	**Sertraline group**	**Control group**
HVR parameters	**SDNN (ms)**	**84 ± 28**	**86 ± 27**	**115 ± 32***	**83 ± 26**
Arrhytmic events	**VEs**	**563 ± 241**	**537 ± 235**	**261 ± 131***	**558 ± 220**

HP: reduced sympathetic CNS activity

HP: down-regulation of some ventricular 5HT receptors

•p< 0.001
HRV = heart rate variability;
SDNN = standard deviation of all normal R-R intervals
VEs = ventricular extrasystoles