

**PREGNANCY & VALVE
DISEASE :
THINGS THAT GO WRONG &
HOW TO HANDLE THEM**

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Valvular heart disease & Pregnancy

- ③ 35 yo: G₃P₁Ab₁. IUP @ 11 wks
- ③ Diagnosed 1 mo ago with AS after having an episode of chest burning and a syncopal episode following a moderate exertion
- ③ Echocardiogram - normal LV size & function, LVH, calcific AV. Flow velocity - 5.7 m. Gradient: peak 130 mmHg, mean - 89 mmHg. AVA -0.7 cm² .

Valvular heart disease &

- ⊙ 29 yo, G₅P₁Ab₂, IUP @ 24 wks.
- ⊙ S/P MV valvuloplasty in 1999, asymptomatic prior to pregnancy.
- ⊙ MVA: 1.0 cm², Peak MV gradient: 20 mmHg, LA: 56mm
- ⊙ NYHA functional class III.
- ⊙ Metoprolol- 50 mg q 8 hrs, Furosemide- 20 mg / day, Lovenox-50 mg q 12 hrs.
- ⊙ Systolic BP 66-90 mmHg.
- ⊙ A symptomatic, documented episode of nodal bradycardia HR 29 bpm.

Valvular heart disease &

- ⊙ Risks to the mother/ fetus during pregnancy.
- ⊙ Effectiveness and safety of drugs.
- ⊙ Anticoagulation.
- ⊙ Valvuloplasty/surgery during pregnancy.
- ⊙ Selection of PHV.
- ⊙ Mode of delivery.
- ⊙ Need for antibiotic prophylaxis

VALVULAR DISEASE AND PREGNANCY

The Effect of Valvular Heart Disease on Maternal and Fetal Outcome of Pregnancy

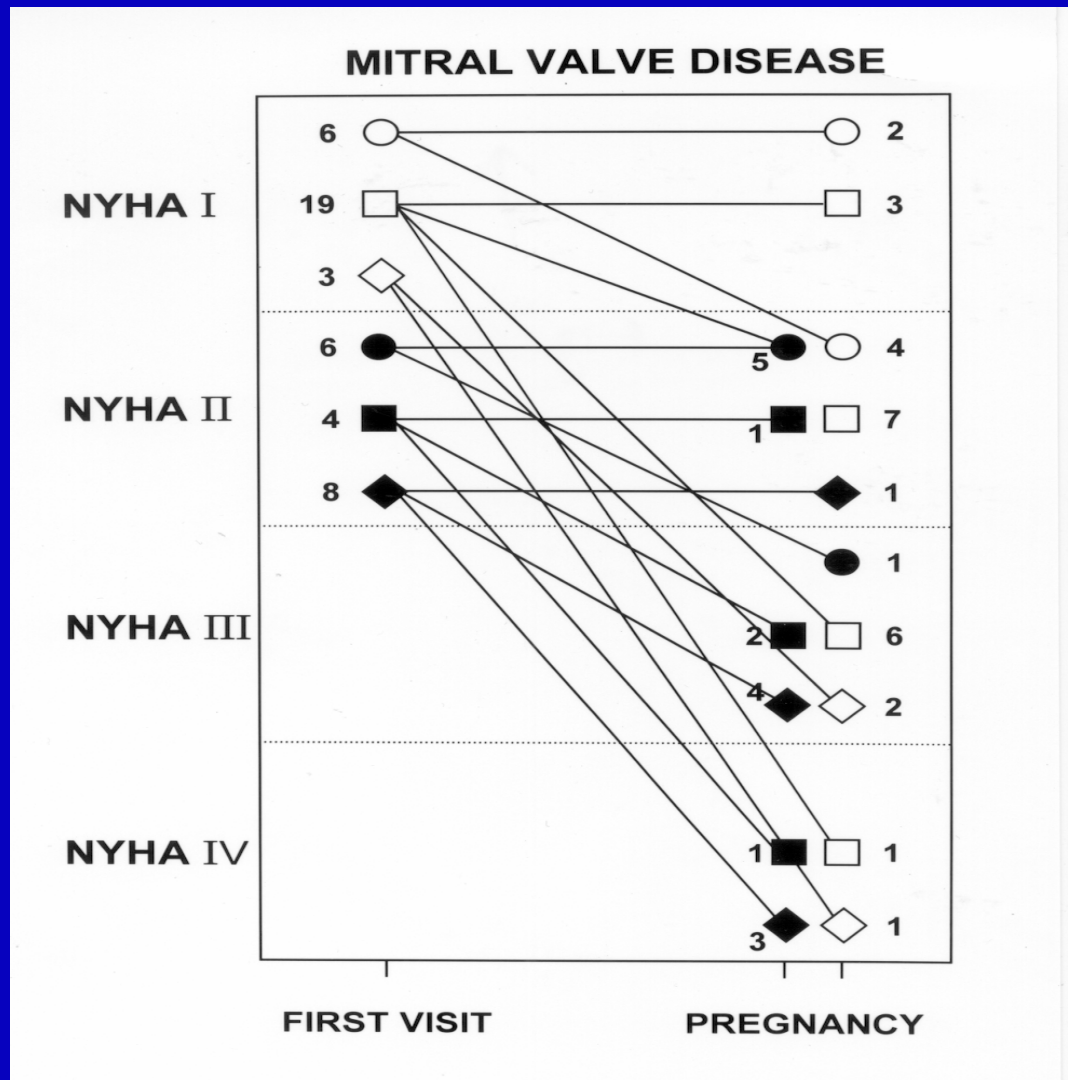
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- OBJECTIVES** The aim of this study was to evaluate the association between valvular heart disease (VHD) and maternal and fetal outcome in a relatively large group of patients by a comparison to a well-matched control group.
- BACKGROUND** Available information regarding outcome of pregnancy in women with VHD is limited to either anecdotal reports or small series of patients without an appropriate control. A better understanding of the effects of valvular abnormalities on pregnancy outcome is of value for risk assessment and the design of a therapeutic plan.
- METHODS** A retrospective evaluation was made of 66 pregnancies in 64 women with VHD cared for at a tertiary-care center with a high-risk obstetrics/cardiology clinic and 66 individually selected normal pregnant women matched in age, ethnicity, obstetrical and medical history, time of initial prenatal care, and year of pregnancy.
- RESULTS** Women with VHD had a significantly higher incidence of congestive heart failure (38% vs. 0%; $p < 0.00001$), arrhythmias (15% vs. 0%, $p = 0.002$), initiation or increase of cardiac medications (41% vs. 2%, $p < 0.0001$), and hospitalizations (35% vs. 2%, $p < 0.0001$). Mortality, however, occurred in only one patient (2% vs. 0%, $p = \text{NS}$) with aortic stenosis (AS) and coarctation. Moreover, VHD also had an effect on fetal outcome, resulting in an increased preterm delivery (23% vs. 6%, $p = 0.03$), intrauterine growth retardation (21% vs. 0%, $p < 0.0001$), and a reduced birth weight (2897 ± 838 g vs. 3366 ± 515 g, $p = 0.0003$). Increased maternal morbidity and unfavorable fetal outcome were seen mostly in patients with moderate and severe mitral stenosis (MS) and AS.
- CONCLUSIONS** Pregnancy in women with MS and AS is associated with marked increase in maternal morbidity and unfavorable effect on fetal outcome, which are related to severity of disease. Despite high maternal morbidity, mortality is rare. (J Am Coll Cardiol 2001;37:893-9)
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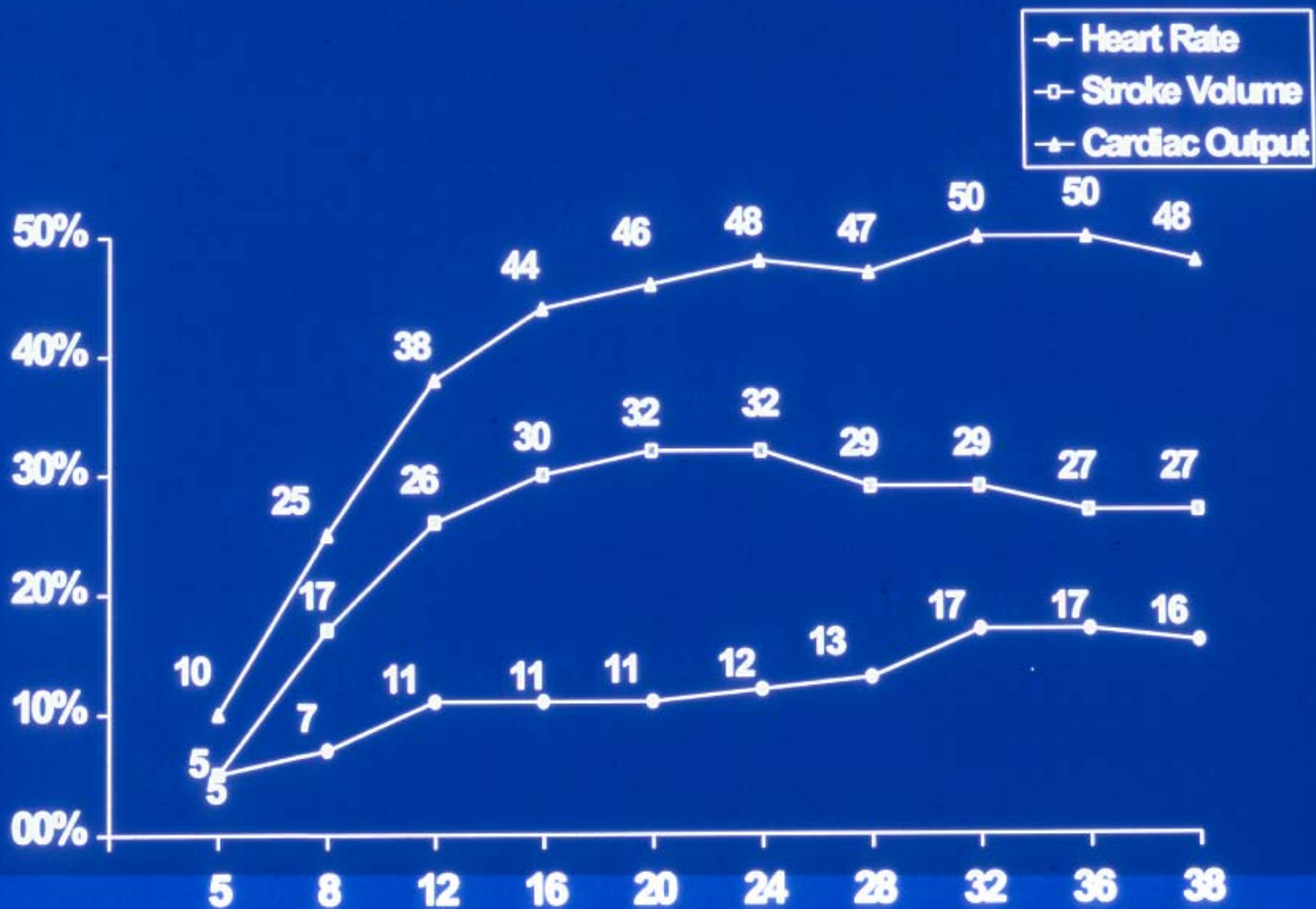
Valvular Heart Disease and Pregnancy

(Hameed et al JACC 2001;37:893-899)



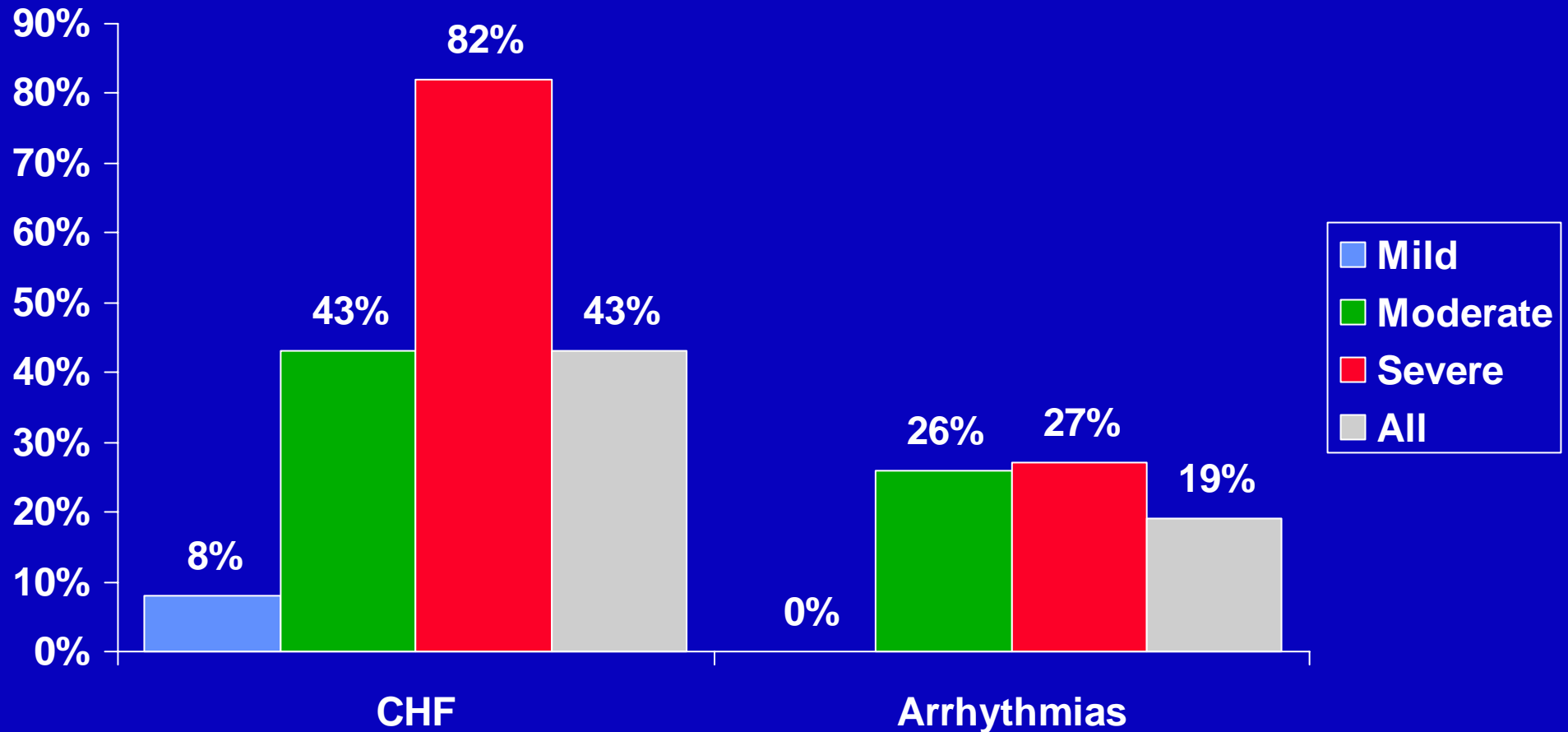
- N=46,
- clinical deterioration=74%
- MR = mild

HEMODYNAMIC CHANGES DURING PREGNANCY



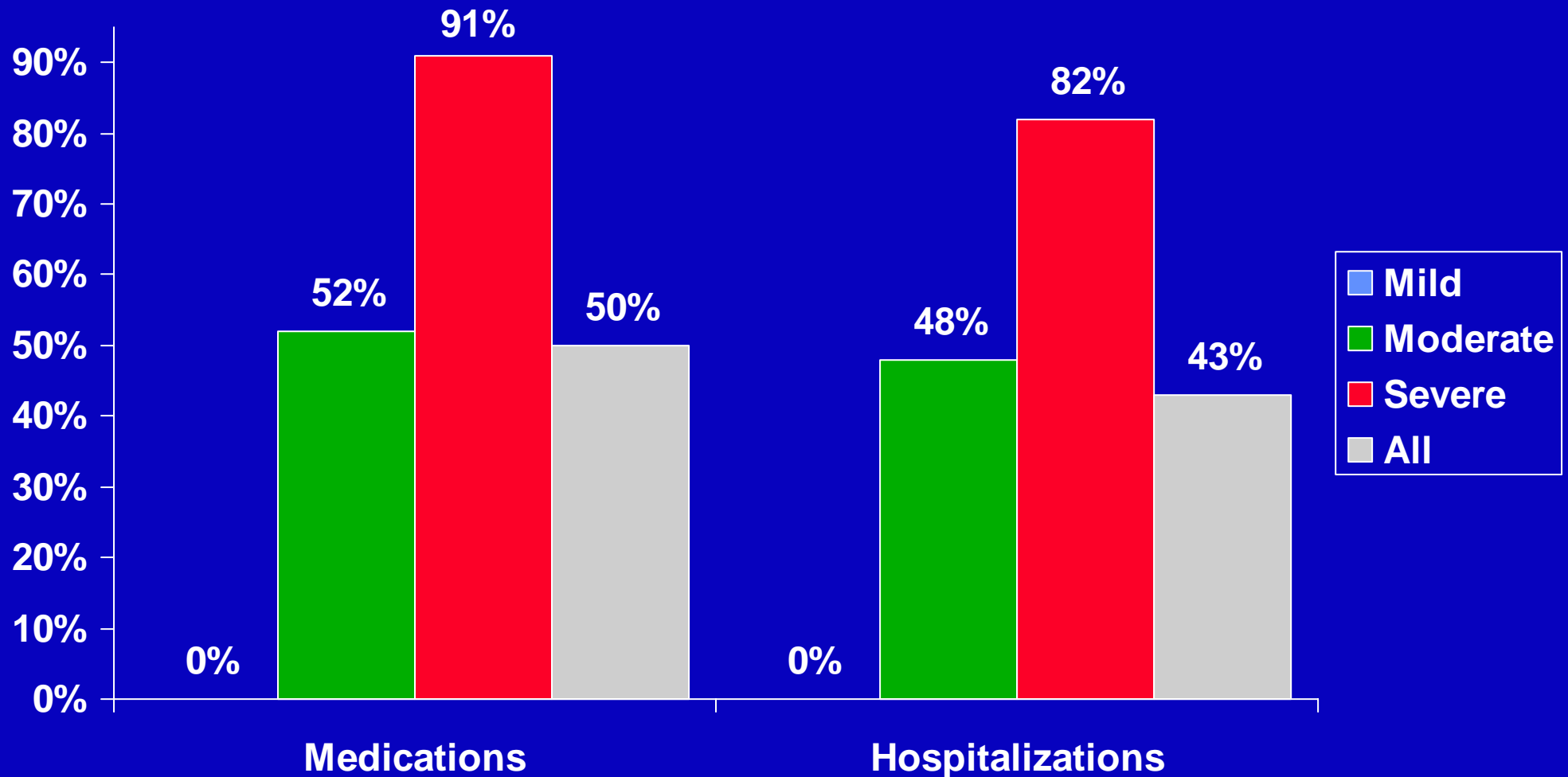
Mitral Stenosis and Pregnancy

Maternal Outcome



Mitral Stenosis and Pregnancy

Maternal Outcome



Mitral Stenosis and Pregnancy

Silversides et al AJC 2003;91:1382

TABLE 2 Maternal Cardiac and Fetal and/or Neonatal Outcomes (lesion severity)

Outcomes	All Pregnancies (n = 80)	Degree of MS		
		Mild (n = 42)	Moderate (n = 29)	Severe (n = 9)
Any maternal cardiac or fetal/neonatal event*	42 (53%)	17 (40%)	18 (62%)	7 (78%)
Maternal cardiac event*	28 (35%)	11 (26%)	11 (38%)	6 (67%)
Pulmonary edema	25	10	10	5
Arrhythmias	9	3	3	3
Stroke	0	0	0	0
Need for invasive intervention	0	0	0	0
Cardiac arrest or death	0	0	0	0
Fetal and/or neonatal event*	24 (30%)	9 (21%)	11 (38%)	4 (44%)
Premature birth	17	6	8	3
Small for gestational age	6	2	4	0
Respiratory distress	5	3	2	0
Intraventricular hemorrhage	0	0	0	0
Fetal and/or neonatal death	2	1	0	1
Maternal obstetric event	6 (8%)	4 (10%)	2 (7%)	0
Postpartum hemorrhage	5	3	2	0
Pregnancy-induced hypertension	1	1	0	0

*Events are not mutually exclusive.

n = number of pregnancies.

Congenital AS and Pregnancy

Silversides et al AJC 2003;91:1386

TABLE 1 Baseline Characteristics

Characteristic	No. of Pregnancies (%)
Total no. of pregnancies (39 women)	49
Diagnosis	
Bicuspid aortic valve	41 (91%)
Sub-AS	4 (8%)
Sub-AS and bicuspid aortic valve	2 (4%)
Hypoplastic descending aorta and bicuspid valve	2 (4%)
Maternal age (yrs)	30 ± 6
Gestational age at baseline antenatal visit (wks)	19 ± 8
Primigravida	15 (31%)
History of arrhythmias, stroke, or pulmonary edema before pregnancy	3 (6%)
Cardiac medication before pregnancy*	2 (4%)
NYHA functional class	
I	44 (90%)
II	5 (10%)
Aortic valvulotomy or valvuloplasty before pregnancy	5 (10%)
Severity of aortic stenosis	
Mild	4 (8%)
Moderate	16 (33%)
Severe	29 (59%)
Associated lesions (not mutually exclusive)	
Repaired coarctation	14 (29%)
Ligated patent ductus arteriosus	3 (6%)
Hypoplastic descending aorta	1 (1%)
Unrepaired ventricular septal defect	1 (1%)
Repaired atrial septal defect	1 (1%)
Moderate or severe aortic regurgitation	18 (37%)
Mild left ventricular systolic dysfunction (ejection fraction 40%–59%)	2 (4%)
	Peak Gradient (aortic valve area) for each category of AS †
Stenosis	
Mild	26 ± 7 mm Hg (2.0 ± 0.2 cm ²)
Moderate	43 ± 14 mm Hg (1.3 ± 0.2 cm ²)
Severe	67 ± 25 mm Hg (0.8 ± 0.2 cm ²)

*Two patients took acetylsalicylic acid, 1 of whom was prescribed nitroglycerin tablets.

†AVA not calculated in the 6 women with sub-AS.

NYHA = New York Heart Association.

Congenital AS and Pregnancy

Silversides et al AJC 2003;91:1386

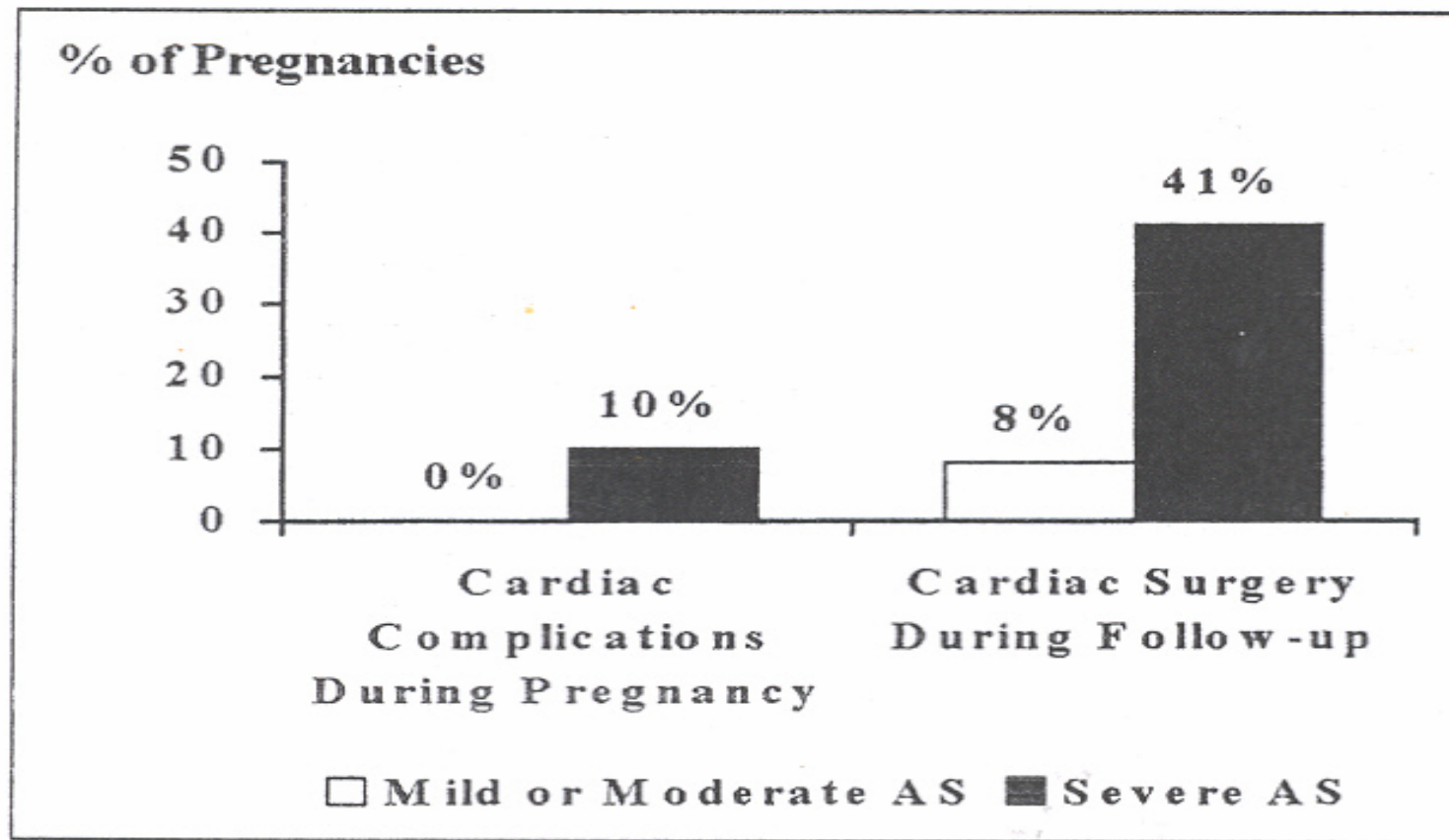
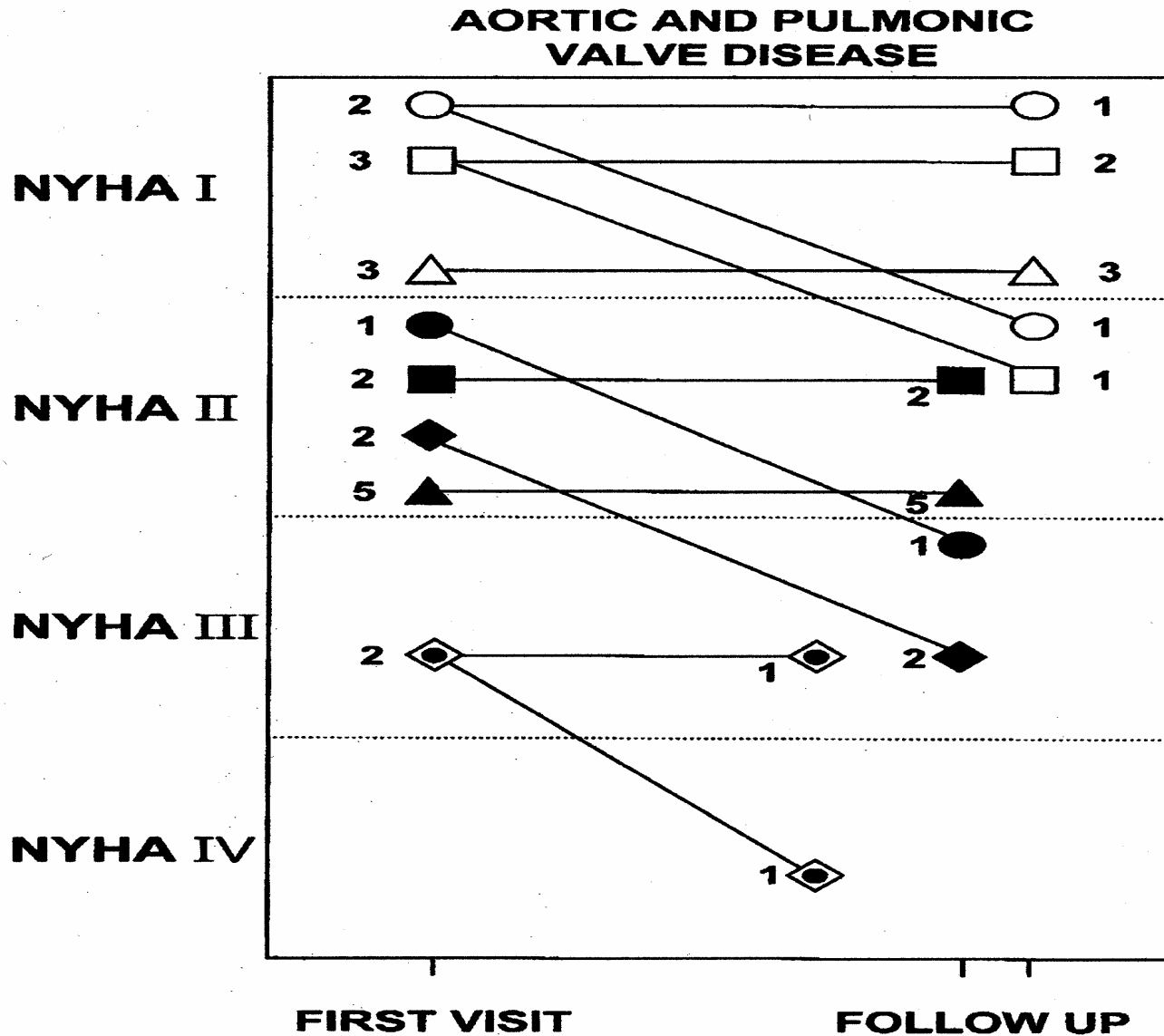


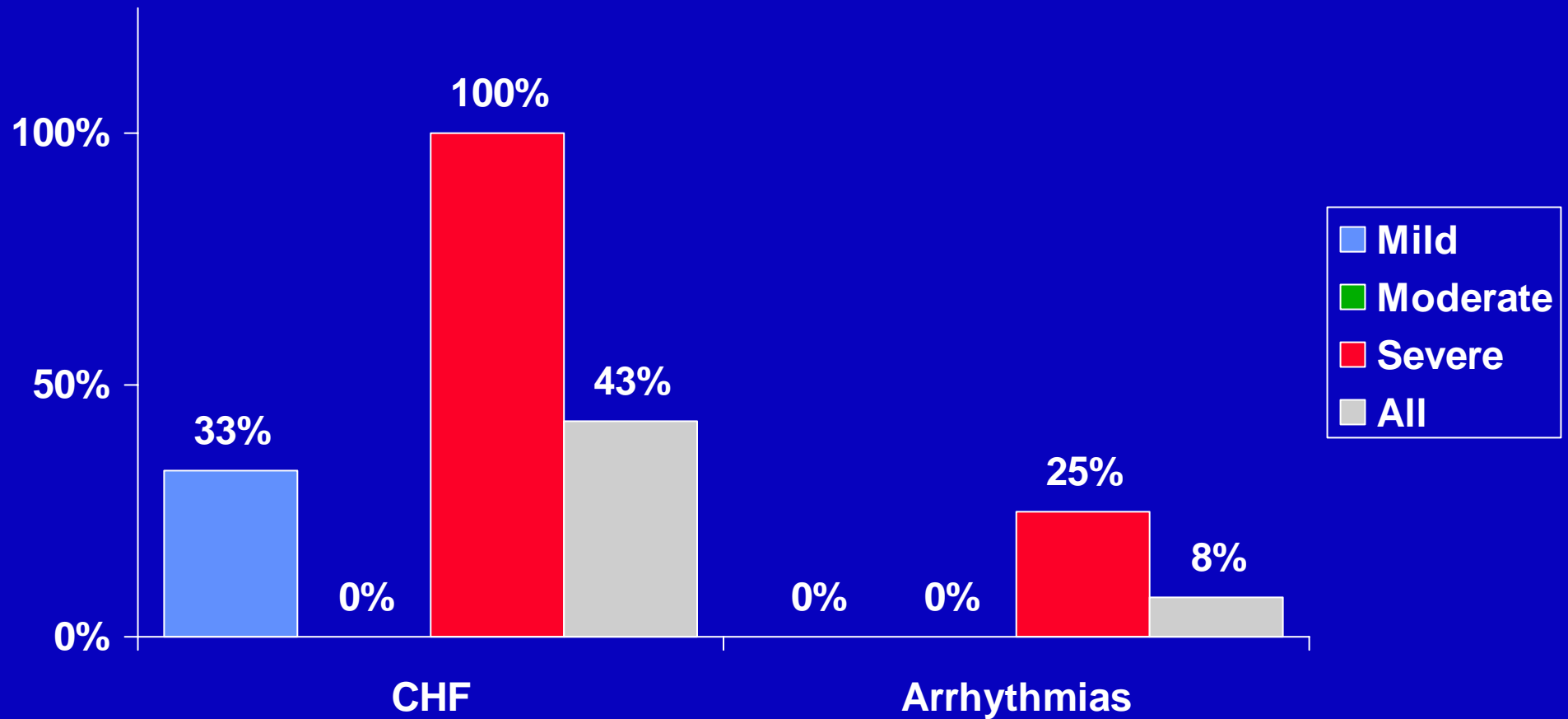
FIGURE 1. The relation between early and late maternal cardiac complications and the severity of AS is shown. Early cardiac complications ($p < 0.001$) and the need for cardiac surgery at follow-up ($p = 0.01$) occurred more often in women with mild or moderate AS than in those with severe AS.

AORTIC STENOSIS



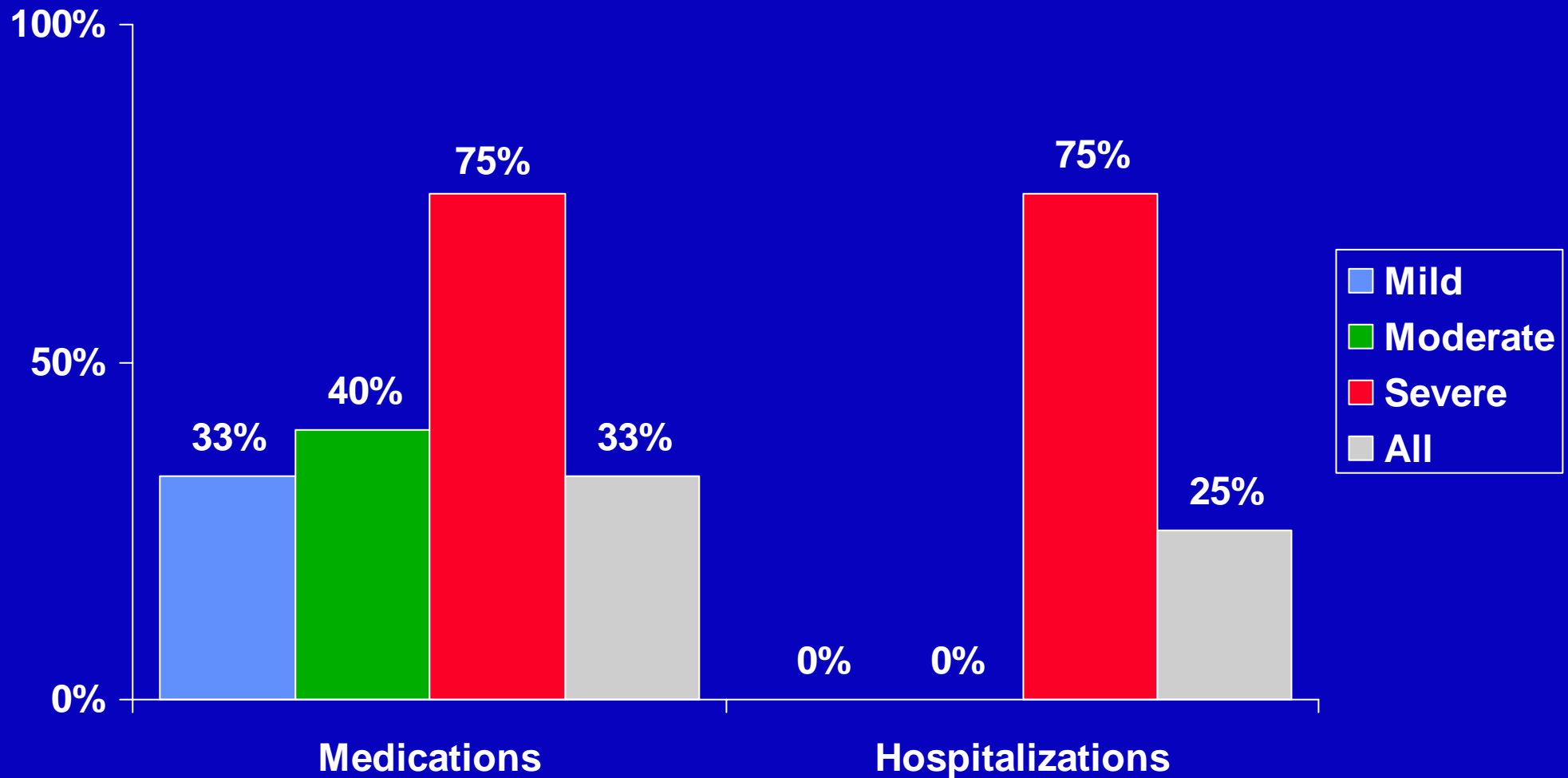
Aortic Stenosis and Pregnancy

Maternal Outcome



Aortic Stenosis and Pregnancy

Maternal Outcome



Valvular Heart Disease & Pregnancy

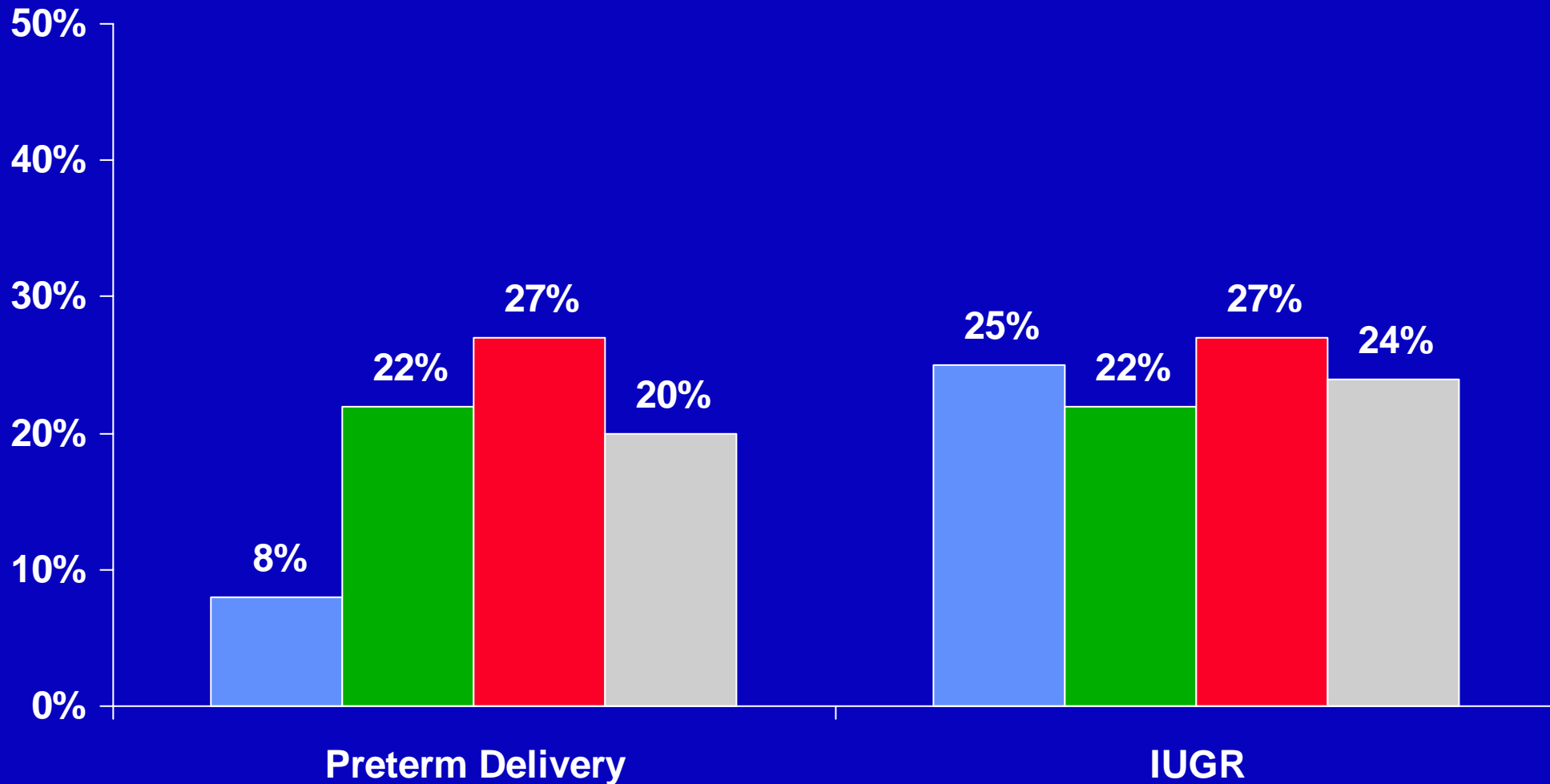
(Hameed et al JACC 2001;37:893)

Post Delivery Complications

**Pulmonary edema in 3 pts with MS
(1 severe & 2 moderate) and 2 pts
with AS (1 moderate and 1 severe)**

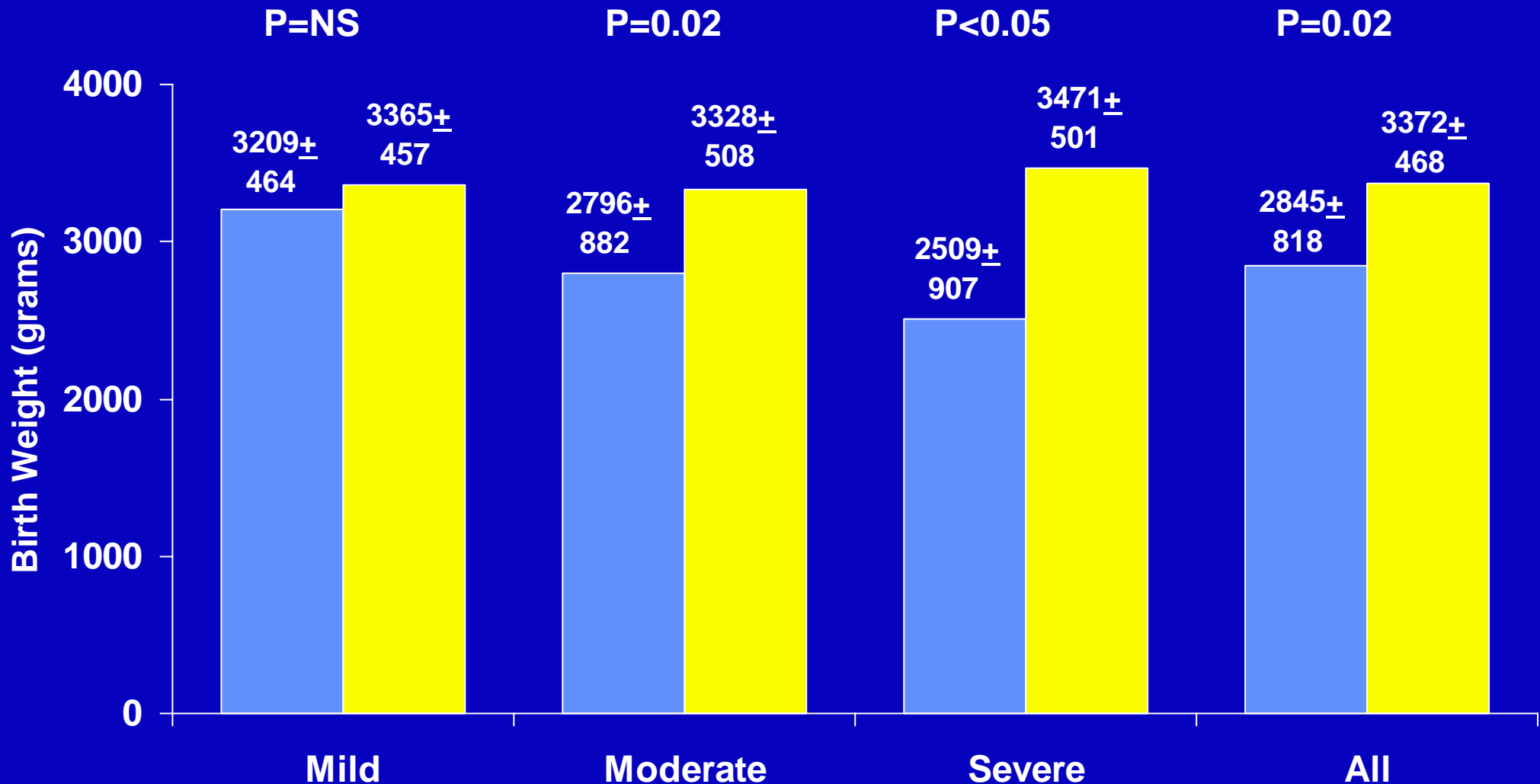
Mitral Stenosis & Pregnancy

Fetal Outcome



Mitral Stenosis & Pregnancy

Effect on Birth Weight



The Contribution of Mild & Moderate Preterm Birth to Infant mortality

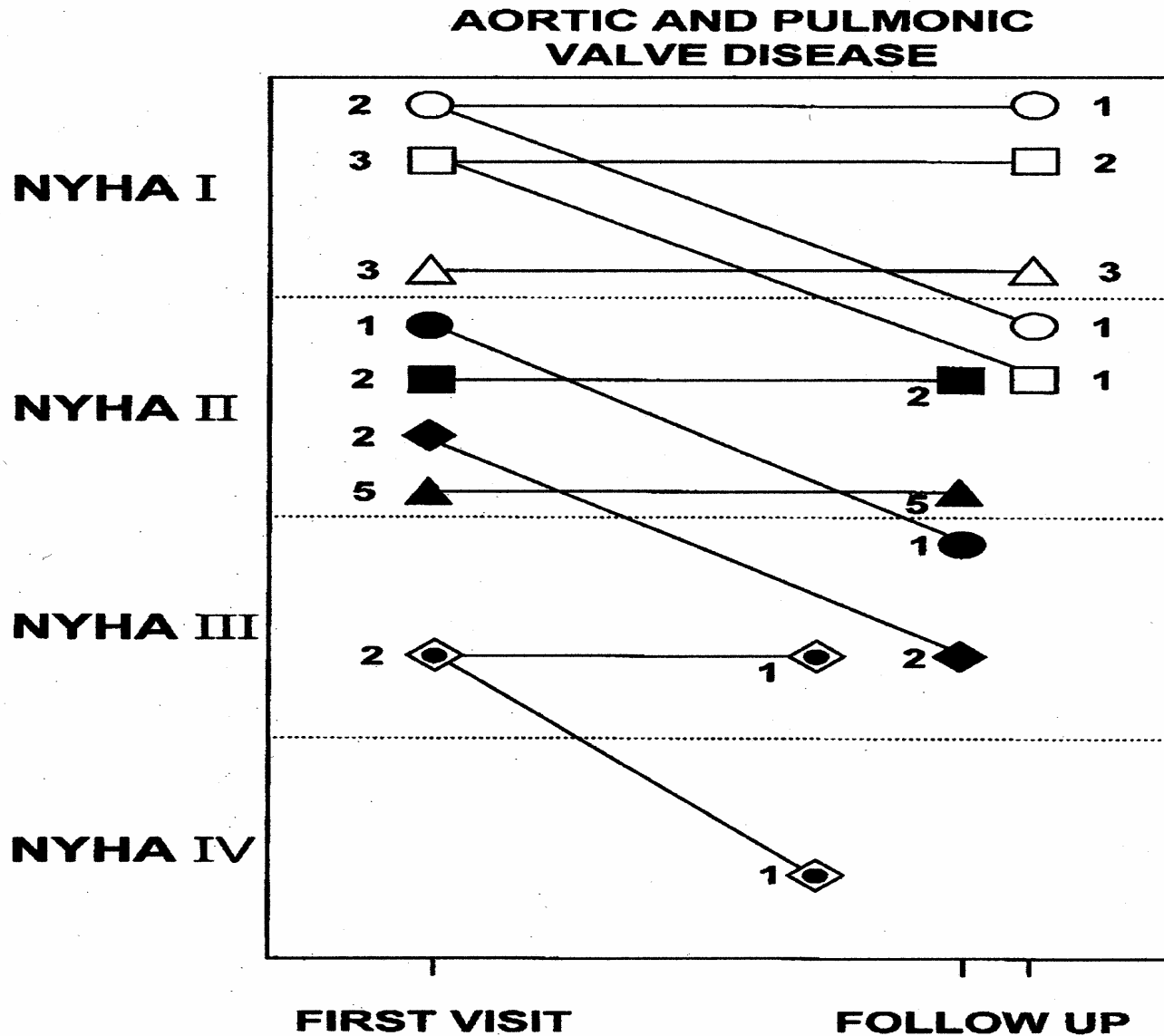
Relative risk for infant death from all causes.

<u>Gestational Week</u>	<u>U.S.</u>	<u>Canada</u>
22-33	6.6	15.2
34-36	2.9	4.5

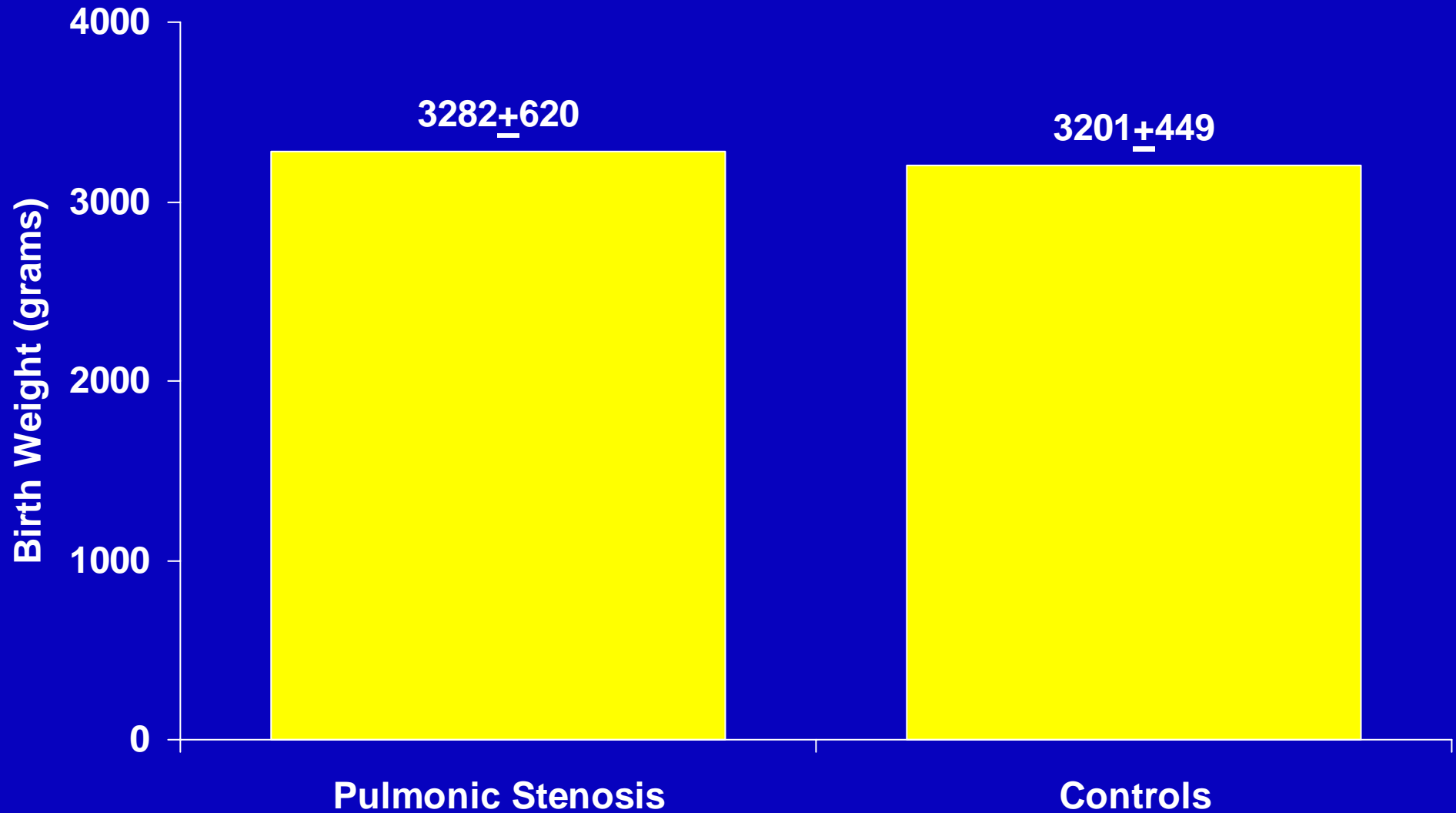
Impact of Low Birth Weight on Cardiovascular Disease in Adult Life

- **IFGR is associated with increased incidence of endothelial dysfunction (*JACC* 2001;103:1264), HTN and DM DM (*BMJ* 1995;310:116), and CV mortality (*BMJ* 1993;306:422) in adults.**

PULMONIC STENOSIS



Pulmonic Stenosis & Pregnancy Effect on Birth Weight



**PREGNANCY IN WOMEN
WITH VALVULAR
DISEASE**

MODE OF DELIVERY

Valvular Heart Disease & Pregnancy

(Hameed et al JACC 2001;37:893)

Mode of Delivery

	<u>VHD</u>	<u>Controls</u>
Vaginal	87%	92%
Forceps/ vacuum	42%	0%

Valvular Stenosis in Pregnancy: Mode of Delivery

Silverside et al 1. AJC 2003;91:1982 2. AJC 2003;91:1386

Valvular Disease	No of Patients	No of Pregnancy	No of (%) Cesarean Deliveries	No (%) of Cesarean Deliveries for Cardiac indication
Mitral Stenosis	39	49	16 (33%)	1 (2%)
Aortic Stenosis	74	80	21 (26%)	1(1.25%)

Valvular Heart Disease and Pregnancy

- **Complications during pregnancy can be predicted by prepregnancy functional severity of valvular stenosis, Hx of arrhythmias, LV function and Hx of TE.**
- **Pregnancy in women with moderate & severe MS and AS is assoc. with increased maternal morbidity (CHF, arrhythmias, hospitalizations) need to take meds, and unfavorable fetal outcome (prematurity, IUGR, low birth**

Valvular Heart Disease and

- In spite of significant increase in maternal morbidity, mortality is rare.
- Outcome of pregnancy in pts with mild MS & AS (valve area $>1.5 \text{ cm}^2$) and with PS is comparable to healthy controls.
- Pregnancy in women with Regurgitant lesions (MR, AR, TR) is well tolerated, probably due to the ventricular unloading effect of gestation.

BB's in the Management of Pregnant Women with MS

(Al Kasab et al *Am J Obstet Gynecol* 1990;163:37)

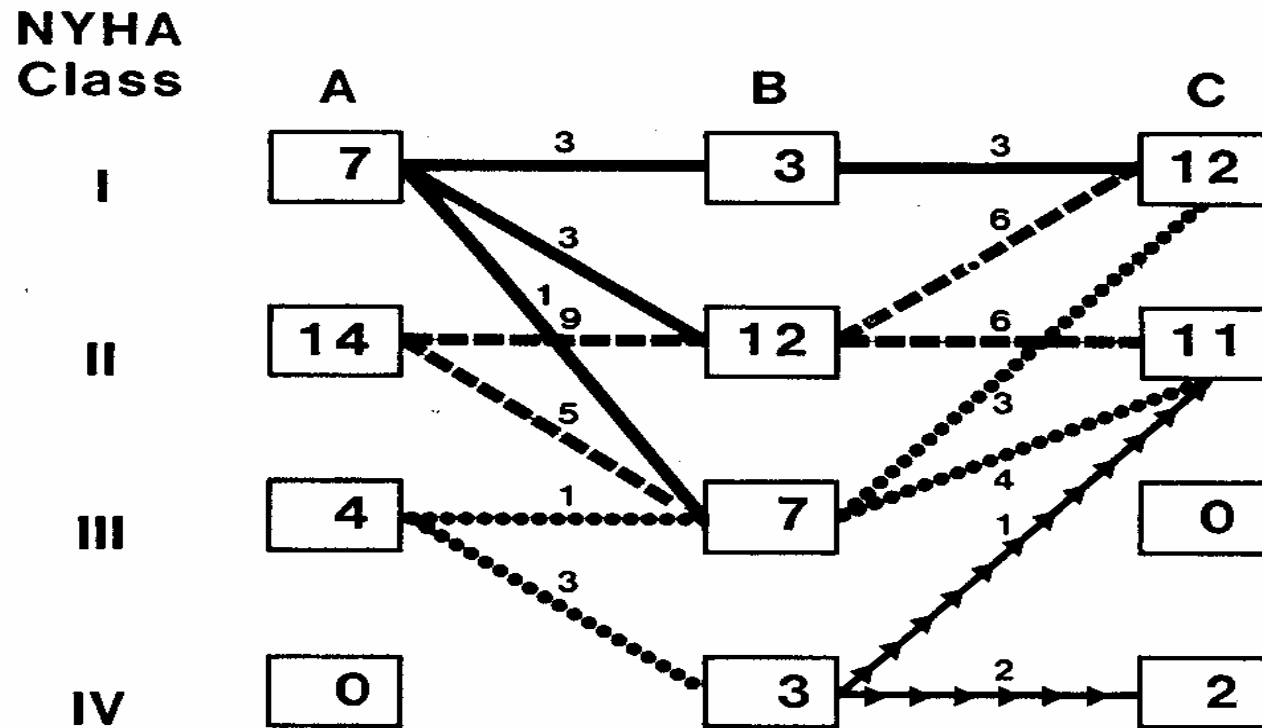


Fig. 1. New York Heart Association class (*NYHA*) changes in symptomatology: **A**, before pregnancy; **B**, during pregnancy before initiation or increase of β -blockade therapy; **C**, during pregnancy after adequate β -blockade. Note significant improvement from **B** to **C** ($p < 0.01$).

**PERCUTANEOUS
VALVULOPLASTY
DURING
PREGNANCY**

Percutaneous Balloon Valvuloplasty and pregnancy

- Over 300 cases have reported since 2000.**
- Most procedures done at end of the 2ND trimester or during the 3rd trimester in pts with severe (class III and IV) in spite adequate medical therapy.**
- Results are similar to the nonpregnant population.**
- Complications are uncommon and include : MR, Temponade, contractions and premature delivery.**
- Aortic valvuloplasty has also been successfully performed in symptomatic pts with severe AS.**

Should Mitral Valvuloplasty be done prophylactically?

- Although valvuloplasty improves hemodynamics and symptoms it does not seem to prevent fetal complications such as prematurity, IUGR, still birth
- Mitral valvuloplasty should therefore be performed in symptomatic patients with severe MS in spite medical Tx.

**CARDIAC
SURGERY
PREGNANCY**

Outcome of CV surgery in pregnancy

(Weiss et al, *AJOG* 1998: 179:1643)

- ⊙ CV surgery during pregnancy is associated with high fetal mortality ($\approx 30\%$).**
- ⊙ Mortality was not related to gestational week at time of surgery, use of CPB, duration of CPB, lowest temp during CPB & use of fetal monitoring.**
- ⊙ Even with optimal diagnostic & therapeutic modalities and experienced team, fetal survival could not be guaranteed.**

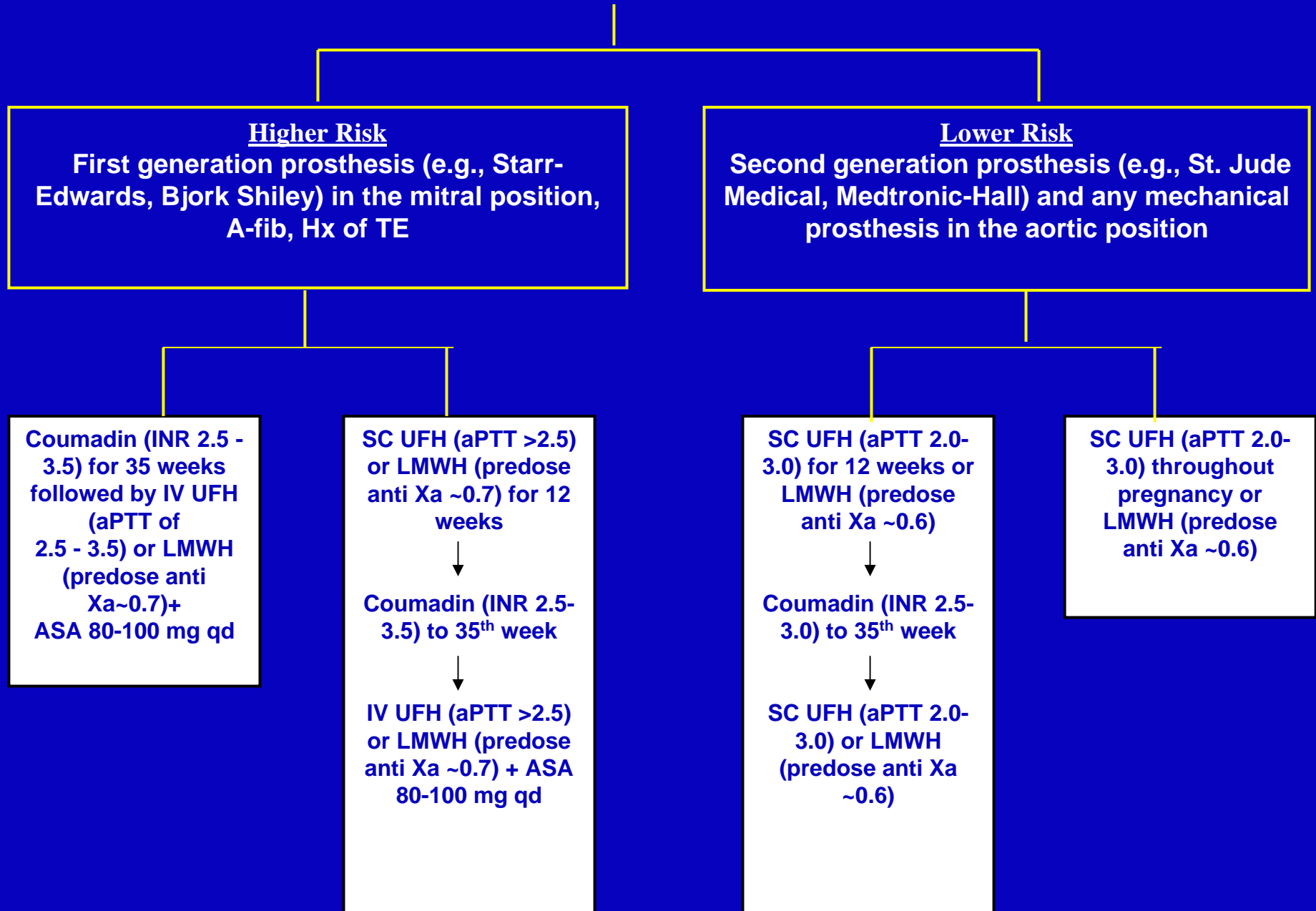
Mitral Balloon Dilation vs Commissurotomy in Pregnancy

Neonatal and Fetal Mortality

(de Souza et al JACC 2001;37:900)

	PBMV <u>(N=21)</u>	MVC <u>(N=24)</u>	P <u>Value</u>
Total mortality	1 (5%)	8 (38%)	0.025
Death <24 hrs post procedure	0 (0%)	5 (21%)	0.051

Pregnancy in a patient with mechanical heart valve



**OUTCOME OF PREGNANCY IN
WOMEN WITH PROSTHETIC
HEART VALVES:
AN INTERNATIONAL SURVEY**

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Valvesinpregnancy.info