Title: RISK OF CARDIAC OPERATIONS IN PATIENTS WITH CONCOMITANT PULMONARY DYSFUNCTION

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Introduction. It is logical that impaired pulmonary function from any cause might add increased risk to cardiac surgical procedures. We know of no studies in which this postulated additional risk has been proven or quantitated. Therefore, we studied a group of adult cardiac surgical patients who were suspected clinically of having sufficient pulmonary dysfunction to warrant complete pulmonary function testing (PFT) as part of their preoperative evaluation. Our objectives were: 1) to determine if the presence of impaired pulmonary function was associated with increased mortality and/or morbidity from cardiac surgery and 2) to quantitate any additional risk.

Methods. During 1979-1980, 151 adult patients scheduled for cardiac surgery were referred for complete preoperative PFT. Of these, 107 patients were diagnosed by clinical findings and PFT results as having significant pulmonary dysfunction. Guidelines for significant pulmonary disease included symptoms of productive cough, wheeze, and/or dyspnea plus PFT's of FEV_1<2.0 l or FEV_1/FVC<65%, plus either VC<3.0 l or MVV<80 l/min. These 107 patients underwent 62 coronary artery bypass grafts (CABG), 36 valve replacements, and 9 atrial septal defect (ASD) repairs. During this same period, 1780 adults either without sufficient preoperative pulmonary symptoms to warrant complete PFT referral or with normal PFT's underwent the same procedures. We examined medical, anesthetic, and PFT records to ascertain specifics of mortality and morbidity.

Results. The presence of significant pulmonary dysfunction was not associated with an increased mortality risk for CABG but was associated with twice the mortality risk for valvular surgery (P<0.05). Patients with pulmonary function impairment had an approximate 10 percent incidence of perioperative myocardial infarctions regardless of the cardiac procedure. Specific pulmonary complications occurred 50 to 100% more often in patients with impaired pulmonary function compared to patients with preoperative symptoms suggestive of pulmonary disease but who had normal PFT's (P<0.05). Presence of preoperative pulmonary impairment was not associated with an increase in the percentage of patients requiring prolonged intubation or hospitalization but was associated with a greater percentage of those requiring prolonged ICU stays. Smokers in both groups had threefold increases in pulmonary complications compared to nonsmokers (P<0.01). A numerically higher percentage of female than male patients had pulmonary complications. This was not statistically significant perhaps because of the small number of females in our group of pulmonary-impaired patients. Females did not have higher mortality or perioperative myocardial infarction rates. Excluding two intraoperative deaths, there were no increases in mortality, perioperative myocardial infarction, or postoperative pulmonary complication rates in pulmonary-impaired patients associated with prolonged cardiac bypass (>120 min) or aortic occlusion (>90 min) or large infusions of cardioplegic solutions (>1500 cc) or crystalloid added to the bypass pump (>3000 cc). Specific anesthetics had no significant effect on mortality or morbidity.

Discussion. Most surprising was our finding that patients with impaired pulmonary function undergoing CABG did not have increased mortality or postoperative pulmonary complication rates compared to patients without preoperative symptoms suggestive of pulmonary dysfunction or compared to those with suggestive symptoms but normal preoperative PFT's. By contrast, the presence of impaired pulmonary function in valve-diseased patients was associated with twice the risk of mortality and pulmonary complications. These findings suggest underlying differences in pulmonary dysfunction between coronary artery-diseased vs valve-diseased patients. Most of our coronary artery-diseased patients with impaired PFT's appear to have lung disease consisting of increased secretions and airway obstruction. Our valve-diseased patients may instead have had secondary lung disease with vascular hypertension and parenchymal damage related to their valvular heart disease. We conclude that significant pulmonary function impairment was not associated with increased mortality or pulmonary complication risk for CABG's but was associated with twice such risks for valvular cardiac operations.

30 Day Mortality Incidence

	PFT-proven pulm dis	Others*	
Overall	7/107 (6.5%)	82/1780 (4.6%)	N.S.
CABG	0/62 (0%)	27/994 (2.7%)	N.S.
Valves	6/36 (16.7%)	46/668 (6.9%)	P<0.05
ASD (adults)	1/9 (11.1%)	9/118 (7.6)	N.S.

*1780 patients without PFT-proven pulmonary disease.

Pulmonary Complications

	PFT-proven pulm dis	Others*	
Overall	47/107 (43.9%)	13/44 (29.5%)	P<0.05
CABG	18/62 (29.0%)	6/23 (26.1%)	N.S.
Valves	26/36 (72.2%)	5/18 (27.8%)	P<0.01
ASD	3/9 (33.3%)	2/3 (66.7%)	N.S.

*44 patients with normal preoperative PFT's.

Perioperative MI*

Overall	10/107 (9.3%)
CABG	6/62 (9.7%)
Valves	4/36 (11.1%)
ASD	0/9 (0%)

*107 patients with PFT-proven pulmonary disease