

# An Electronic Patient Record In The Evaluation Of The Outcome Of Cardiac Surgery Patients Requiring Intra-Aortic Counterpulsation

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## Abstract

An electronic patient record was searched to determine the demographic, operative and post operative factors which predicted outcome in cardiac surgical patients who required post operative intra aortic counter pulsation. An electronic patient record is fast and useful way in retrospective study.

## METHODS

Fifty five patients who required intra aortic counter pulsation were identified from the archive of an electronic patient record. The archive is organised in tables, which contain all charted events which are timed. These tables were searched for data recorded in the first 24 hours after intensive care admission and recorded data for the following parameters was retrieved; arterial blood gases, inotrope requirements, Haemodynamics, haematological and biochemical results.

The incidence of preoperative factors likely to influence outcome, such as age, gender, cardiac failure, renal failure, diabetes mellitus and myocardial infarction as well as patient outcome in terms of mortality was retrieved from another institutional database.

The relation between preoperative, operative and post operative factors and mortality was analysed. Student's t test and chi square test were used for univariate analysis. Factors which were significantly associated with outcome on univariate analysis were included in a multivariate logistic regression analysis. P values < 0.05 were considered significant.

## RESULTS

Patients details are listed below.

Figure 1

Preoperative	Survive	Mortality	P
Age (Yrs)	66 +/- 1.5	70 +/-2	Ns
Gender	29/36	13/19	Ns
Hypertension	17/36	8/16	Ns
Myocardial infarction	27/36	11/19	Ns
Cardiac failure	12/36	14/19	Ns
Diabetes mellitus	7/36	3/16	Ns
BSA (m2)	1.84 +/-0.3	1.84 +/-0.05	Ns

The only preoperative factor associated with greater mortality was cardiac failure. (Odd ratio 5.6 with 95% confidence interval 1.7-20.9).

Figure 2

Operative	Survive	Mortality	P
Bypass time(min)	112+/- 7	136+/-10	0.06
Cross Clamp time(min)	68+/-6	75+/-8	Ns

No operative factor was predictive of outcome.

**Figure 3**

Post Operative	Survive	Mortality	p
Adrenaline(Max)	0.15+/-0.04	0.39+/-0.05	0.0002
Noradrenalin(Max)	0.22+/-0.05	0.31+/-0.05	Ns
Lactic Acid(Max)	7.2+/-1	12.8+/-1.2	0.0007
PH (Min)	7.24+/-0.02	7.18+/-0.02	0.04
Bicarbonate(Min)	16+/-0.5	14+/-0.5	0.04
Urea (mmol/L)	9.5+/-0.9	10.6+/-1.2	Ns
Creatinine(umol/L)	123+/-9	149+/-12	0.09
Hb g/dl	7.9+/-0.2	8.2+/-0.2	Ns

(Max = maximum, Min = minimum)

Post operative predictive factors on univariate analysis were; lactic acid level, metabolic acidosis and maximal dose of adrenaline but not noradrenalin.

Multivariate logistic regression analysis found that prior heart failure and maximum level of lactic acid was independent predictors of outcome.

**Figure 4**

Factor	p	Odds Ratio (Limits)
Heart failure	0.004	14(2.8-111)
Lactic acid	0.0009	1.3(1.2-1.4)

(Odds ratios are for unit difference in lactic acid levels).

The r<sup>2</sup> was 0.38 and the ROC curve of this model was 0.88. In patients with a prior history of heart failure the lactic acid levels associated with a 25%, 50% and 75% risk of dying are;

**Figure 5**

Risk of dying	Lactic acid mmol/L (95%limits)
25%	3.8 (0 – 7.5)
50%	8 (1.6 – 17)
75%	12.2 ( 8.3 – 43 )

Multiple linear regression analysis demonstrated that peak lactic acid levels were associated with adrenaline dosage (p=0.0002) and not noradrenalin dosage (p=0.26)

## DISCUSSION

An electronic patient record is fast and efficient way for audit and search purpose. This can be used for teaching and medico legal purposes as well. The electronic record facilitated data collection in the evaluation of outcome in this cohort of patients shows that prior heart failure and post operative lactic acidosis predicted outcome. Adrenaline dosage was associated with lactic acidosis and possibly adverse outcome, not noradrenalin.

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