MP2-7

Establishing a UK and Ireland wide model for collating cardiac catheter lab morbidity to improve risk assessment and case planning: A retrospective review of 5 major congenital cardiac centres.

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Introduction: Analysis of mortality and morbidity data has been focused on surgery, with no effective system national system scrutinising congenital catheterisation. In the USA two quality assessment tools focused on congenital catheterisation have been developed; the C3PO database and the CRISP RISk Score. Both are modelled on retrospective data from several thousand of congenital catheterisations, mainly within the USA.

Method: We retrospectively analysed morbidity and mortality data from 1500 consecutive catheterisations from five major congenital heart disease centres across the UK and Ireland, between February 2015 and October 2016. We excluded electrophysiology cases. One independent observer retrospectively calculated CRISP RISk scores and categories, using 8 parameters, for each individual case. We then compared the risk score with observed catheterisation complications, classified by NICOR definitions.

Results: 1500 procedures were analysed from 5 congenital cardiac centres. Centres 1, 3 and 5 provided paediatric and adult congenital catheters and centres 2 and 4 paediatric only. We excluded 17 incomplete data sets leaving n=1483; evenly split between each centre. 1130 were paediatric and 353 adult (≥18years). Table 1 displays the CRISP quoted adverse effect risk in comparison to the observed adverse effect rate across all centres. There were 5 catastrophic complications; 1 in RISk Category 3, 2 in RISk Category 4, and 2 in RISk Category 5. There was an additional 1 death during anaesthetic induction before the procedure.

Table 1: CRISP RISk compared to the observed adverse effect rate. Mild complications (e.g. small haematoma) as classified by NICOR's cardiac catheterisation complication severity definitions have been excluded as not applicable to CRISP RISk score.

CRISP RISk Score Category	CRISP Quoted Adverse Effect Rate (%)	Observed Adverse Effect Rate: Paediatrics & Adults (%)	Observed Adverse Effect Rate: Paediatrics Only (%)	Observed Adverse Effect Rate: Adults Only (%)
CRISP 1	1.0	3/202 **(1.5)**	2/132 **(1.5)**	1/70 **(1.4)**
CRISP 2	2.6	19/612 **(3.1)**	16/440 **(3.6)**	3/172 **(1.7)**
CRISP 3	6.2	34/478 **(7.1)**	25/373 **(6.7)**	9/105 **(8.6)**
CRISP 4	14.4	28/171 **(16.4)**	25/165 **(15.2)**	3/6 **(50.0)**
CRISP 5	36.8	7/20 **(35.0)**	7/20 **(35.0)**	0/0 **(0)**

Conclusion: Although designed for use in paediatrics in the USA, quantitative data has shown important links between the CRISP Catheterization RISk Score and cardiac catheterisation complication rates and severity within paediatric and adult congenital cardiac catheterisation practice, within the UK and Ireland. As well as providing a much needed structure for recording data, the CRISP Catheterization RISk Score may facilitate meaningful morbidity data essential for individualised risk stratification and case planning.