

Steroids for adult cardiac surgery: The debate echoes on

Madam,

The recent era is characterised by an on-going search of interventions that contribute to an improved outcome. Perioperative outcome metrics in the adult cardiac surgical arena are revamping with the continuous refinement of the anesthetic, surgical and perfusion regimes. However, certain

practices like prophylactic steroids for attenuation of the systemic inflammatory response to cardiopulmonary bypass have been extensively studied with inconclusive evidence.

Steroids have long been considered as ‘magic bullets’ against inflammation and are being administered in cardiac surgery for almost past four decades now. This instinctive application has been increasingly interrogated considering the advancements such as heparin coated circuits, membrane oxygenators, centrifugal pumps and modified ultrafiltration aimed at minimizing the

Table 1: A comparison of the DECS and SIRS trial^[3,4]

	DECS Trial			SIRS Trial		
	Dexamethasonee (n=2239)	Placebo (n=2255)	P	Methylprednisolonee (n=3755)	Placebo (n=3752)	P
Subjects:	Adult cardiac surgery			Euro SCORE of at least 6- inclusion criterion		
Steroid:	1 mg/kg dexamethasone			500 mg methylprednisolone		
Primary outcome						
(Composite)	7%	8.5%	0.07	24%	24%	0.53
Mortality	1.4%	1.5%	0.73	4%	5%	0.19
Myocardial injury	NA	NA	NA	13%	11%	<0.01
Myocardial infarction	1.6%	1.7%	0.65	NA	NA	NA
Stroke	1.3%	1.4%	0.71	2%	2%	0.51
Respiratory failure	3%	4.3%	0.02	9%	10%	0.21
Renal failure	1.3%	1.5%	0.15	4%	4%	0.21
Other outcomes						
Delirium	14%	15%	0.79	8%	8%	0.80
Infection	10%	15%	<0.01	12%	13%	0.33
Transfusion	39%	42%	0.03	49%	50%	0.43
Atrial fibrillation	33%	35%	0.14	22%	23%	0.48
Hospital stay (days)	8	9	<0.01	9	9	0.06

Euro SCORE=European system for cardiac risk evaluation; NA=Not applicable; P<0.005 denotes significance with the significant P values presented in italics

pro-inflammatory potential of CPB. Moreover, the myriad of systemic effects attributable to the steroid administration have challenged the prophylactic use furthermore, particularly in diabetics and those prone to infection.

The literature surrounding the evaluation of steroids for adult cardiac surgery recites an interesting tale. The initial meta-analyses included considerably heterogeneous studies demonstrating primary attention to intermediate endpoints rather than appropriate patient effects leading to a lack of robust evidence.^[1,2] This accounted for the escalating empiricism with regards to the steroids amounting to an augmented global variation. This inconsistency in the practice prompted two large multicentre randomised clinical trials (RCT), DEXamethasone for Cardiac Surgery (DECS) trial^[3] and Steroids In cardiac Surgery (SIRS) trial.^[4] The results of the RCTs are depicted in Table 1. Both the trials did not reveal improved primary outcomes. However, a reduced incidence of pulmonary infection and hospital stay was discovered with dexamethasone administration in the DECS trial.

The recent 2018 meta-analysis including 56 RCTs published since the 1970s also failed to demonstrate any clear beneficial impact of steroids on the mortality after cardiac surgery.^[5] DECS and SIRS trials constituted 75% of the total number of study subjects in the meta-analysis accounting for the pattern of the similarity in results. However, the index meta-analysis triggered a few controversies. The analysis depicted an elevated risk of myocardial injury with steroids in sharp contrast to the previous meta-analysis. It is noteworthy that the SIRS trial

also incurred an incremental risk of myocardial injury, with the DECS showing no significant risk of myocardial injury with dexamethasone. The reason elucidated was the heterogeneity in the definition of this outcome considering that SIRS employed creatinine kinase-fraction MB (CK-MB) levels and not mandated more sensitive and specific cardiac troponins. The meta-analysis also reported lower incidence of new onset atrial fibrillation (AF) in the steroid group in background of a statement that the larger trials failed to demonstrate this observation again suggesting a debatable generalisation.

To conclude, the steroid debate continues to snowball with fewer answers and newer questions. It is seductively easy to warrant focussed research in an area of controversy albeit the conglomeration of multitude of factors affecting the outcomes under evaluation with an intervention continue to pose a formidable challenge. The fraternity ardently anticipates more of science and less of empiricism enterprising the application of steroids in adult cardiac surgery.

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Conflicts of interest

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