

Platelet-Rich Plasma Inside the Sternotomy Wound Reduces the Incidence of Sternal Wound Infection

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Objective

Deep sternal wound infection (DSWI) has a high mortality (5%-50%) and morbidity after cardiac surgery, despite the improvement in antibiotic treatments. Platelet-rich plasma (PRP) has been proposed in the treatment of postsurgical infections to promote earlier wound healing. The purpose of this study was to evaluate retrospectively whether the PRP application inside the sternotomy wound after sternal closure can prevent sternal wound infections after cardiac surgery both deep and superficial (SSWI).

Methods

Patient Selection

Institutional review board approval was acquired prior to enrolling patients. Patients undergoing cardiac surgery through a full median sternotomy between January 2007 and January 2012 were enrolled. A total of 671 patients between January 2007 and January 2010 received standard closure (Group A). 433 patients between January 2010 to January 2012 received standard closure with autologous PRP over the sternal closed edges before closure of the subcutaneous tissue (Group B). The primary end point was occurrence of DSWI. Occurrence of SSWI was considered a secondary end point.

PRP Preparation

PRP was obtained from 18 mL of whole blood taken from the patient's central line during anesthesia induction. Whole blood was centrifuged and prepared according to manufacturer's recommendations.

Postoperative Management

All patients received a chest corset for 1 month postoperatively and wound dressing was performed daily. All patients were followed up at 1 week, 1 month, 6 months, and 12 months postoperatively.

Table 1. Preoperative risk factors

Risk Factors	Group A (n = 671)	Group B (n = 422)	P value
Age >70 years	378 (56.3%)	242 (57.5%)	.742
Male sex	422 (62.8%)	272 (64.5%)	.601
Smoking	65 (9.7%)	54 (12.8%)	.108
Diabetes mellitus	263 (39.1%)	186 (44.1%)	.110
Obesity (BMI >30)	249 (37.1%)	164 (38.9%)	.561
COPD	190 (28.3%)	130 (30.8%)	.379
Chronic renal insufficiency	35 (5.2%)	16 (3.8%)	.277
Corticosteroids	7 (1.0%)	6 (1.4%)	.574
NYHA III and IV	288 (42.9%)	197 (46.7%)	.223
Endocarditis	20 (3.0%)	8 (1.9%)	.269
Antibiotic therapy up to operation	217 (32.3%)	124 (29.4%)	.305
Pulmonary vascular disease	93 (13.9%)	71 (16.8%)	.182
Cerebrovascular accident	65 (9.7%)	28 (6.6%)	.078

Results

There were no significant differences in preoperative (Table 1) and intraoperative risk factors (Table 2) between Group A and Group B.

Table 2. Intraoperative risk factors

Risk Factors	Group A (n = 671)	Group B (n = 422)	P value
Isolated CABG	271 (40.4%)	187 (44.3%)	.299
Single IMA	261	184	.352
Double IMA	10	3	.187
Isolated valvular operation	219 (32.6%)	111 (26.3%)	1.000
Other than isolated CABG isolated valvular operation	181 (27.0%)	124 (29.4%)	1.000
Operation time (incision to closure) >300 minutes	101 (15.1%)	55 (13.0%)	.353
Blood transfusion (no. of patients)	305 (45.5%)	209 (49.5%)	.189
Packed red blood cells (U)	2.74 ± 0.99	2.32 ± 1.09	.094
Postoperative bleeding (mL)	630.42 ± 361.20	693.27 ± 333.80	.721
Platelet (n × 10 ³ cells/mm ³) (48 hours postoperative)	125.32 ± 46.73	131.66 ± 49.73	.153
Acute renal failure	21 (3.1%)	14 (3.3%)	.864
Postoperative delirium	75 (11.2%)	52 (12.3%)	.565
Respiratory failure (hypoxia)	22 (3.1%)	10 (2.4%)	.386
Reopening	35 (5.2%)	15 (3.6%)	.201
Hospital mortality	32 (4.8%)	16 (3.8%)	.443

CABG: coronary artery bypass graft; IMA: Internal mammary artery

A total of 10 patients (1.5%) in Group A developed DSWI, compared to 1 patient (0.2%) in Group B ($P= .043$). A total of 19 patients (2.8%) in Group A developed SSWI, compared to 2 patients (0.5%) in Group B ($P= .006$). No adverse reactions were recorded in patients undergoing PRP treatment.

Conclusions

The use of PRP can significantly reduce the occurrence of DSWI and SSWI in cardiac surgery.

Reference

1. Serraino GF, Dominijanni A, Jiritano F, Rossi M, Cuda A, Caroleo S, Brescia A, Renzulli A. Platelet-rich plasma inside the sternotomy wound reduces the incidence of sternal wound infections. *Int Wound J*. 2015;12(3):260-264. doi:10.1111/iwj.12087