OPTIMISING OF ANTIBIOTIC PROPHYLAXIS AT CARDIAC SURGERY CLINIC

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BACKGROUND

Antibiotic prophylaxis (AP) plays an important role in prevention of surgical site infections in cardiac surgery. Despite the availability of many guidelines, daily practice of AP is still far from optimal.

OBJECTIVES

The first aim of the study was to evaluate management of rational AP via pre-intervention audit. The second aim was to assess whether clinical practice of AP was improved after pharmacists´ interventions.

STUDY DESIGN

Six parameters of AP (indication of AP, use of appropriate agent, adequate initial dose, right timing of first dose, perioperative redosing, adequate duration of AP) were evaluated by pharmacist during pre-intervention audit at Cardiovascular Surgery Clinic between March and April 2015. The data were obtained from medical records and hospital information system. Based on the results of pre-intervention audit and regional needs local guideline (LG) of AP was updated by microbiologist and pharmacist according to Surgical Antimicrobial Prophylaxis Guidelines of American Society of Health-system Pharmacists. Updated LG and the most important errors identified during pre-intervention audit were presented to a medical team. Two years later post-intervention audit was performed where implementation of new LG was assessed by measuring the same six parameters as in pre-intervention audit. The results of both audits were compared at 50 similar cardiac surgeries. The data were evaluated by descriptive statistics and Chi-squared test ($p<0.05$).

DISCUSSION

AP was correctly used in all indicated surgeries during pre-intervention and post-intervention audit. Incorrect antibiotic, bacteriostatic clarithromycin in case of penicillin allergy, was given in 11% of all surgeries in pre-intervention audit while all antibiotics were appropriately chosen in post-intervention audit. Clarithromycin was changed to bactericidal vancomycin. Appropriate initial doses were given in only 2% in pre-intervention audit in comparison to 92% in post-intervention audit. After pharmacists´ intervention dose of cefazolin was increased from 1 g, resp. 2 g (weight up 120 kg) to 2 g, resp. 3 g. Despite updating LG dose of vancomycin stayed low (1 g regardless of weight) so medical team was educated to give 15 mg per kilogram of vancomycin. Right timing of AP was increased from 76 to 96% after implementation of new LG. Perioperative redosing was given in none of the indicated cases in pre-intervention audit so it was added to updated LG. After intervention this parameter was improved to 100%. AP was prolonged for more than 48 hours in 51% in pre-intervention audit versus 18% in post-intervention audit. Duration of AP was reduced to maximum 48 hours in new LG. Audit of AP, education of the medical team, updating the LG and sufficient time to accept the changes seem to be appropriate because in 80% of surgery interventions of post-intervention audit were all parameters of rational AP in accordance with guidelines.

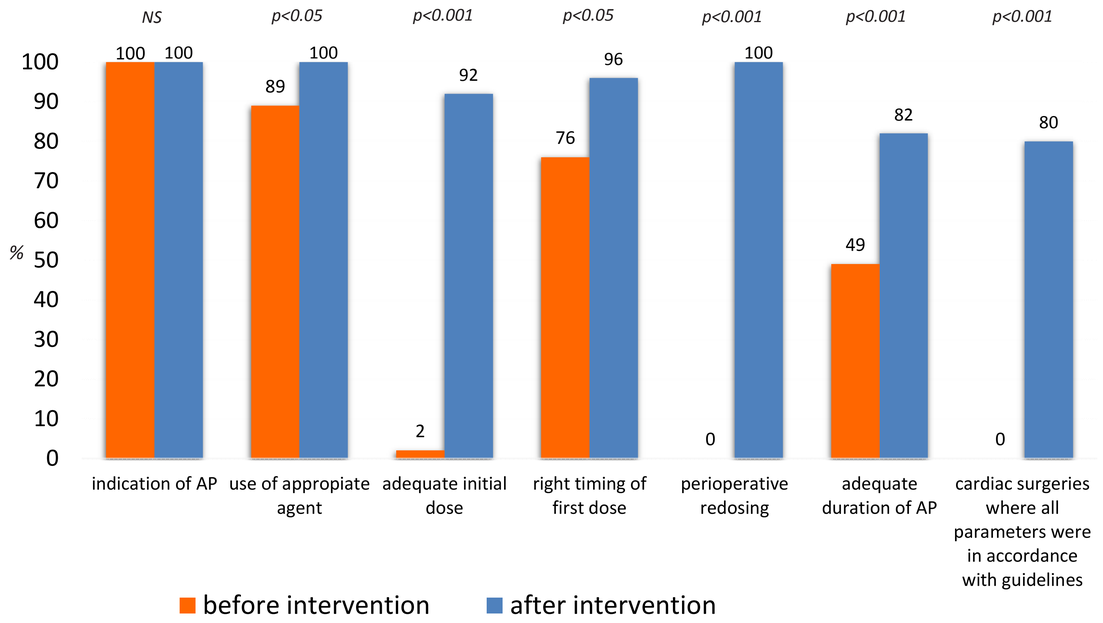
LIMITATIONS

This study has some limitations which have to be mentioned. The number of surgical procedures included was small and numbers of surgery types were not identical.

RESULTS

Characteristics	Pre-intervention audit	Post-intervenetion audit
Number of surgeries	50	50
Patient demographics		
Sex	males 37, females 13	males 40, females 10
Age in years (range; mean ± SD)	32-82; 64 ± 9.8	18-84; 61 ± 10.8
Penicillin allergy	5	4

SD - standard deviation



AP - antibiotic prophylaxis, NS - not significant

	Pre-intervention audit	Post-intervenetion audit	Pre-intervention audit	Post-intervenetion audit	
Surgery type			Given antibiotic/s + dose		Recommended antibiotic/s + dose
Aortocoronary bypass graft	17	24	cefazolin 1 g, 2 g (weight up 120 kg)	cefazolin 2 g, 3 g (weight up 120 kg)	cefazolin 2 g, 3 g (weight up 120 kg)/ cefuroxime 1,5 g
Aortocoronary bypass graft (penicillin allergy)	3	1	clarithromycin 500 mg	vancomycin 1 g	clindamycin 900 mg/ vancomycin 15 mg/kg
Heart transplant	1	1	ceftriaxone 2 g	cefuroxime 1,5 g	cefazolin 2 g, 3 g (weight up 120 kg)/ cefuroxime 1,5 g
Implantation of mechanical circulatory support	3	3	vancomycin 1 g + ciprofloxacin 400 mg	vancomycin 1 g + cefuroxime 1,5 g	vancomycin 15 mg/kg + cefuroxime 1,5 g/ vancomycin 15 mg/kg + ciprofloxacin 400 mg
Myxoma extirpation	1	1	cefazolin 1 g, 2 g (weight up 120 kg)	cefazolin 2 g, 3 g (weight up 120 kg)	cefazolin 2 g, 3 g (weight up 120 kg)/ cefuroxime 1,5 g
Pacemaker implantation	1	1	cefazolin 1 g, 2 g (weight up 120 kg)	cefazolin 2 g, 3 g (weight up 120 kg)	cefazolin 2 g, 3 g (weight up 120 kg)/ cefuroxime 1,5 g
Valve replacement	17	14	cefazolin 1 g, 2 g (weight up 120 kg)	cefazolin 2 g, 3 g (weight up 120 kg)	cefazolin 2 g, 3 g (weight up 120 kg)/ cefuroxime 1,5 g
Valve replacement (penicillin allergy)	2	3	clarithromycin 500 mg	vancomycin 1 g	clindamycin 900 mg/ vancomycin 15 mg/kg
Others	5	2	cefazolin 1 g, 2 g (weight up 120 kg)	cefazolin 2 g, 3 g (weight up 120 kg)	cefazolin 2 g, 3 g (weight up 120 kg)/ cefuroxime 1,5 g

CONCLUSION

- Substantial deficiencies of rational AP were identified during pre-intervention audit.
- Clinical practice of AP and high acceptance of updated LG have been significantly improved after pharmacists´ interventions.

REFERENCES

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