

Towards tailored perioperative antibiotic prophylaxis: a multicentre pre-intervention analysis in the H2020 REVERSE project

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BACKGROUND

Surgical-site infections (SSIs) in colorectal surgery are a leading cause of postoperative complications. ESCMID/EUIC conditionally recommends tailored perioperative antibiotic prophylaxis (PAP) for patients undergoing colorectal surgery colonized with extended-spectrum beta-lactamase (ESBL) organisms [1]. However, prospective studies assessing the feasibility and the impact of PAP targeting carbapenem-resistant Enterobacterales (CRE) are limited. This study presents baseline data from the pre-implementation phase of the H2020 REVERSE project that aims to assess the feasibility and the efficacy of implementing tailored PAP in settings highly endemic for CRE.

METHODS

Prospective, observational, multi-center, quasi-experimental study enrolling patients aged ≥18 years scheduled for colorectal surgery at four European hospitals in Greece, Italy, Romania, and Spain. During the baseline phase (May 2023 to May 2024), all patients received PAP according to local guidelines, with no rectal swabs collected to identify ESBL or CRE carriers. Determinants of SSIs within 30 days post-surgery were assessed with univariate and multivariate analysis.

RESULTS

A total of 734 patients were included, with 399 (54%) being male and a median age of 68 years (IQR: 58-76). The overall incidence of SSI was 6.1% (45/734). Enterobacterales were the responsible pathogens in most SSIs (48.8%; 22/45), with only 6 ESBL producers and 2 CRE. Univariate analysis revealed that previous radiotherapy, surgical wound class, urgency of surgery, type of PAP, bowel preparation, and the duration of the surgical procedure were associated with an increased risk of SSI. Only previous radiotherapy and the absence of bowel preparation remained significantly associated with SSI rates in the multivariate analysis (Table 1). Notably, the overall duration of PAP did not align with current international guidelines in approximately 40% of cases (Figure 1), and 2.1% of the prolonged PAP was justified by intraoperative findings suggestive of an active infection (Table 1).

Patients' characteristics	Overall (N=734)	no SSI (N=689)	SSI (N=45)	P-value *	P-value **
Age (Median, IQR)	68 (58, 76)	68 (59, 76)	63 (55, 75)	0.2	
Sex (Male)	399 (54%)	378 (55%)	21 (47%)	0.3	
Chronic Kidney Disease	93 (13%)	87 (13%)	6 (13%)	>0.9	
Diabetes	153 (21%)	148 (22%)	5 (11%)	0.1	
Body Mass Index (Median, IQR)	26.5 (23.5, 29.4)	26.6 (23.5, 29.4)	26 (24.1, 28.1)	0.6	
Treatment received in the previous 3 months					
Not known	508 (69%)	478 (69%)	30 (67%)	0.7	
Antibiotics	97 (13%)	93 (13%)	4 (8.9%)	0.4	
Chemotherapy	91 (12%)	84 (12%)	7 (16%)	0.5	
Radiotherapy	73 (9.9%)	63 (9.1%)	10 (22%)	0.009	0.03
Other immunosuppressant	31 (4.2%)	30 (4.4%)	1 (2.2%)	>0.9	
Type of PAP					
Aminopenicillin + BLI	421 (57%)	395 (57%)	26 (58%)		
ZincGenCeph + metronidazole	126 (17%)	123 (18%)	3 (6.7%)	0.037	
Cefazolin + metronidazole	117 (16%)	109 (16%)	8 (18%)		
Other	39 (5.3%)	32 (4.6%)	7 (16%)		
Cefazolin	19 (2.6%)	18 (2.6%)	1 (2.2%)		
Ciprofloxacin + metronidazole	12 (1.6%)	12 (1.7%)	0 (0%)		
Bowel preparation					
No	129 (18%)	110 (16%)	19 (44%)		
Only mechanical	158 (22%)	149 (22%)	9 (21%)	<0.001	<0.001
Only oral antibiotics	5 (0.7%)	5 (0.7%)	0 (0%)		
Both	440 (60%)	425 (62%)	15 (35%)		
Reasons for prolonged PAP					
No reason	220 (77%)	214 (80%)	6 (30%)		
According to local practice	39 (14%)	30 (11%)	9 (45%)		
Suspected early post-operative infection	17 (5.9%)	12 (4.5%)	5 (25%)	<0.001	
Intra-operative findings of infection	6 (2.1%)	6 (2.3%)	0 (0%)		
Suspected infection from sources different from the abdomen	4 (1.4%)	4 (1.5%)	0 (0%)		
Duration of surgery (hours)	3.20 (2.33, 4.27)	3.17 (2.33, 4.25)	3.85(3.00,4.83)	0.012	0.067

Table 1: Univariate (*) and multivariate (**) analysis for SSI risk

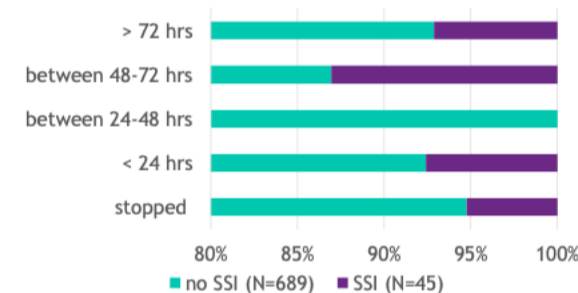


Figure 1: Duration of PAP in the enrolled population

CONCLUSIONS

Our findings highlight that in many cases, local practice does not fully comply with international guidelines regarding PAP duration. Implementing local guidelines with targeted PAP based on rectal swab results and appropriate bowel preparation could optimize the choice of the molecule, reduce unnecessary prolonged prophylaxis, and potentially lower SSI rates.

REFERENCES

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