

Less is More: Reducing Antibiotic Burden in Elective Colorectal Surgery Preparation

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Background

- **Surgical site infections (SSIs)** remains a major burden in elective colorectal surgery (5–23%)^{5,6}.
- SSIs, **occurring within 30-days post surgery**, can affect the surface or deeper tissues near surgical area⁴.
- SSIs is characterized by redness, pain, heat, swelling at incision wound or discharge of pus³.
- **Increases hospitalization stay and healthcare costs**⁷.
- IV antibiotics are mandatory, but the **role of oral antibiotics (OA) ± mechanical bowel prep (MBP) is controversial**^{2,5,6}.
- MBP is not routinely recommended for elective colorectal surgery except in rectal surgery with a stoma, However, if used, it is recommended to combine with OA^{2,6}.
- **Guidelines don't specify optimal dosing, leading to wide variation in practice**².
- Early studies showed that while 3g of OA resulted in significant side effects like nausea and vomiting without reducing infection rates compared to 1g or no OA, recent meta-analyses and the MOBILE2 trial involving over 560 rectal resections have confirmed that MBP and OA combined with IV prophylaxis significantly reduce SSIs^{1,4,6}.
- **These findings establish oral antibiotic prophylaxis with MBP as evidence-based practice while highlighting the need to optimize dosing strategies to balance efficacy with patient tolerance.**

Aim

To evaluate the clinical effectiveness of a reduced-dose oral antibiotic regime (1g Neomycin and 1g Metronidazole) with MBP in elective colorectal surgery, evaluating on:

- SSIs rates within 30days
- hospital length of stay; and
- cost implications.

Methodology

A single-centre retrospective review analysed 102 patients undergoing elective laparoscopic or open colorectal surgery between July 2024 to May 2025.

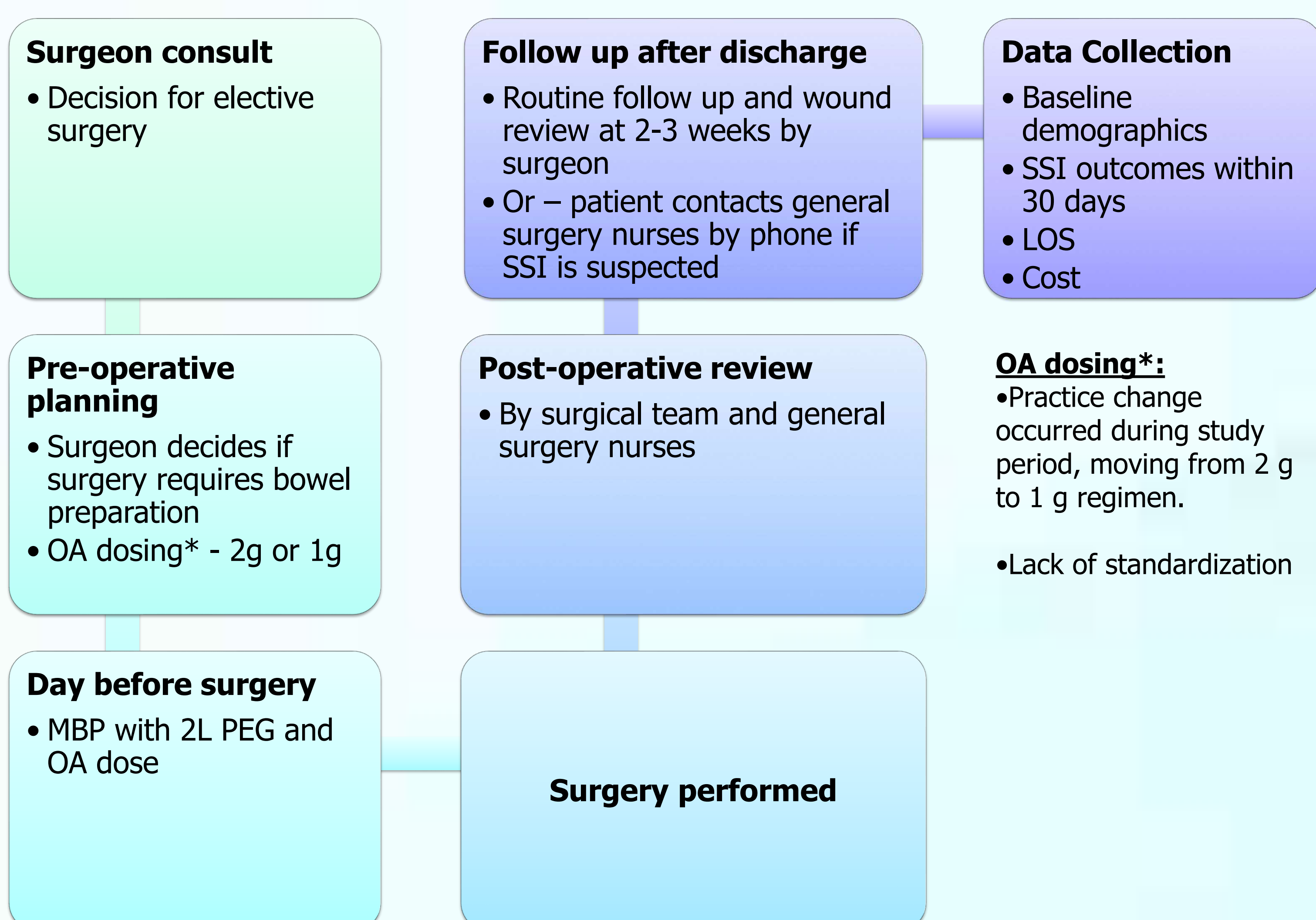
Patients were grouped by antibiotic dose received:

- **Standard dose group: 2g Neomycin + 2g Metronidazole (n=48)**
- **Reduced dose group: 1g Neomycin + 1g Metronidazole (n=54)**

Both group 1 & 2 received 2L of Polyethylene Glycol (PEG) before operation + standard IV antibiotics intraoperatively.

Figure 1 explains how these looks like in practice.

Figure 1: How this look in practice



Statistical analysis was performed using SPSS version 29.0.

- Baseline characteristics were compared using t-tests for continuous variables (eg age, BMI) and chi-square tests for categorical variables (gender, surgery type, etc).
- SSI was analysed using logistic regression, adjusting for potential confounders including ASA score, surgery type, age, BMI, and gender.
- Hospital length of stay was compared using Mann-Whitney U test due to non-normal distribution.

Results

Table 1: Baseline characteristics

Characteristics	1g of OA (n=54)	2g of OA (n=48)	P-value
Age, years*	64.81 ± 9.50	67.42 ± 10.85	0.200
BMI, kg/m ² *	24.81 ± 4.71	25.84 ± 5.76	0.320
Male sex†	33 (61.1%)	30 (62.5%)	0.885
Open Surgery†	13 (24.1%)	18 (37.5%)	0.141
ASA III-IV†	18 (33.33%)	24 (50%)	0.088

Footnotes:

*Data presented as mean ± standard deviation; analysed using independent samples t-test
 †Data presented as n (%); analysed using chi-square test
 ASA = American Society of Anaesthesiologists physical status classification

Table 2: SSI rates within 30days

Characteristics	1g of OA (n=54)	2g of OA (n=48)	Odd Ratio (95% CI)	P-value
SSI, n (%)	3 (5.6%)	9 (18.8%)		
Unadjusted comparison			0.26 (0.07 – 0.96)	0.039
Adjusted comparison†			0.20 (0.03-1.23)	0.082

†Adjusted for ASA score, surgery type, age, BMI, and gender

Table 3: Hospital length of stay

Characteristics	1g of OA (n=54)	2g of OA (n=48)	P-value*
Median (IQR)	4 (3)	6.5 (8)	0.002
Mean ± SD	5.59 ± 5.16	7.81 ± 5.26	

*Mann-Whitney U test
 IQR = Interquartile Range

Discussion

- The 2g group was older, had higher ASA score and more open surgeries – all factors that likely contributed to higher SSI and prolonged LOS. Nevertheless, patient age, gender, ASA risk scores, surgery types, and BMI were comparable between groups with no significant differences (Table 1).
- Both groups received MBP + IV antibiotics → hence MBP itself does not account for differences.
- SSI rates were significantly higher in the 2g OA group. Even accounting for patient risk differences, 1g group still shows a strong protective effect (OR = 0.20), though borderline significant (p = 0.082) (Table 2).
- Reduced-dose OA (1g Neomycin and 1g Metronidazole) in elective colorectal surgery has halved the pill burden (Figure 2) and shortened hospitalization stay (Table 3) by 2.5 days, saving approximately \$2507.32 per patient (Figure 3).

Figure 2: Reduced pill burden from 14 tablets to 7 tablets



Figure 3: Patient total savings (Derived from average per bed day cost from FY2024)

$$\text{Patient total savings of } \$2507.32 = \text{Hospitalization savings of } \$1000 \times 2.5 \text{ days} = \$2500 + \text{Oral antibiotic savings of } \$7.32$$

Study population Impact:

- **54 patients** treated with 1g protocol
- **Total savings:** \$2,507.32 × 54 = **\$135,395**

Limitations

- The single-centre design limits generalizability, and the modest sample size restricts power for subgroup analyses.
- While the adjusted analysis showed a large effect size (OR = 0.20), the borderline significance (p = 0.082) indicates need for larger confirmatory studies.
- Unable to fully exclude unmeasured confounding factors that might influence outcomes.

Conclusion

- Lowering the prophylactic OA dose to 1g of Neomycin and 1g of Metronidazole with MBP for elective colorectal surgery is safe and effective.
- It reduces pill burden, achieves meaningful cost savings without compromising surgical outcomes.
- Future studies can consider a multi-centre randomized controlled trials with larger sample sizes.

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