Does topical intrawound application of vancomycin powder reduce the rate of surgical site infection in spinal surgery: A case-control study

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Conflict of Interest

The authors of this manuscript have no competing interests that influence the results and discussion of this paper.

Disclosures

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Background

Surgical site infection (SSI) after spine surgery is debilitating with significant increase in health care costs, hospital stay and morbidities.

Recent studies have suggested the application of topical intrawound vancomycin powder before surgical closure as a promising method for reducing the SSI rate after spine surgery.

However, its use is controversial and ongoing research projects are focused on identifying its safety, efficacy and the potential patient population.

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Kang DG, Holekamp TF, Wagner SC, Jr RAL. Intrasite vancomycin powder for the prevention of surgical site infection in spine surgery: a systematic literature review. Spine J. 2015;15(4):762-770.

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Aim

To compare the SSI rates in spinal surgery with or without topical intrawound application of vancomycin powder in addition to standard IV antibiotic prophylaxis.

Patients and Methods

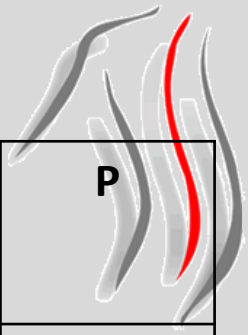
- A retrospective case study with historic control
  - January 2015 to December 2016
- A total of 158 patients undergoing spinal surgery for indications other than infections
  - Eighty-eight (55.7%) patients who had received intrawound vancomycin were compared to 70 (54.3%) matched historical controls who did not.

Patients and Methods

- Inclusion criteria:
  - patients undergoing open spine surgery at any level.
- Exclusion criteria:
  - current or recent infection, previous history of infections, infection as the primary indication, ACDFs, minimally invasive surgeries, biopsy procedures, lumbar diskectomies, laminectomies, foraminotomies, rod lengthening procedures and patients allergic to vancomycin.
- All patients received standard systemic antibiotic prophylaxis
  - According to clinical practice guidelines* for antimicrobial prophylaxis in surgery as of 2g IV cefazolin within 60 minutes before surgical incision followed by 1g IV cefazolin every 6 hours for 1 day

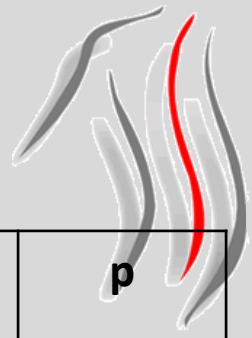
*Bratzler DW, Dellinger EP, Olsen KM, et al. Clinical practice guidelines for antimicrobial prophylaxis in surgery. American journal of health-system pharmacy : AJHP : official journal of the American Society of Health-System Pharmacists. Feb 1 2013;70(3):195-283

Results-I (Baseline Characteristics)



Parameter	Control:2015 (No Vancomycin)	Treatment:2016 (Vancomycin)	P
Total no. of patients	70	88	
Age (mean ± s.d.)	49.31±22.77	50.77±22.47	
Sex			
Male	26 (37.1%)	40 (45.5%)	
Female	44 (62.9%)	48 (54.5%)	
ASA (n-%)			
I	42 (60.0%)	42 (47.7%)	
II	18 (25.7%)	27 (30.7%)	
III	10 (14.3%)	17 (19.3%)	0.307
IV	0 (0.0%)	2 (2.3%)	
Diagnosis			
Deformity	10 (14.3%)	9 (10.2%)	
Degeneration	37 (52.9%)	53 (60.2%)	
Trauma	6 (8.6%)	11 (12.5%)	0.649
Tumors	8 (11.4%)	7 (8.0%)	
Others	8 (11.4%)	7 (8.0%)	

Results-II (Surgical Characteristics)



Parameter	No Vancomycin (Control)	Vancomycin (Treatment)	p
Instrumentation (n-%)			
Yes	56 (80.0%)	85 (96.6%)	
No	14 (20.0%)	3 (3.4%)	0.001
Vertebral fusion (n-%)			
= or > 3	49 (70.0%)	69 (78.4%)	0.227
< 3	21 (30.0%)	19 (21.6%)	
No. of vertebral fusion (Mean and range)	4 (0-18)	4 (0-18)	0.226
Surgery Duration (Mean and range) min.	270 (90-600)	330 (120-600)	0.004
Blood loss (Mean and range) ml	275 (0-4509)	400 (50-6000)	0.001
Total day of admission(Mean and range) days	3 (0-38)	4 (1-18)	0.019

Results-III (Comparison of V and No V Groups)

Infection	No Vancomycin	Vancomycin	Total	P
Not infected	69 (98.6%)	85 (96.6%)	154(97.5%)	0.431
Infected	1 (1.4%)	3 (3.4%)	4(2.5%)	
Total	70	88	158	

Results-IV (Characteristics of infected patients)

S. N.	Group	Age/ Sex	Diagnosis	Levels of fusion	ASA	Surgery duration	Blood loss	Infection	Culture	Treatment
1.	Control (No V)	62/F	Degenerative	3	III	360 min	500ml	Deep	Morganella morganii and Staphylococcus epidermidis	Debridement+ IV Antibiotics + VAC
2.	Treatment (V)	79/F	Degenerative	7	I	300 min	600 ml	Deep	Escherichia coli	Debridement+ IV Antibiotics
3.	Treatment (V)	74/F	Degenerative	8	I	450 min	600 ml	Deep	Pseudomonas aeruginosa	Debridement+ IV Antibiotics + VAC
4.	Treatment (V)	35/F	Others (Congenital deformity)	10	I	450 min	1500 ml	Deep	Escherichia coli	Debridement+ IV Antibiotics

Conclusion

This study has demonstrated that topical intrawound application of vancomycin powder does not reduce the risk of SSI in spinal surgery.

Moreover, it may also affect the underlying pathogens increasing the propensity for gram negative species.