Adherence to the AUA penile prosthesis antibiotic prophylaxis guidelines in diabetic patients is associated with significantly higher risks of device infection

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Introduction

The most devastating complication following penile prosthesis (PP) implantation is infection requiring device explantation. At present there are no randomized clinical trials assessing the efficacy of different antibiotic regimens as prophylaxis before surgery. Current AUA guidelines recommend antibiotic prophylaxis before PPI with an aminoglycoside and either a 1st/2nd generation cephalosporin or vancomycin. EAU guidelines recommend treatment with an aminopenicillin/beta lactamase inhibitor or piperacillin/tazobactam.

We conducted a multi-institutional study to examine infection rates in diabetic patients undergoing PP implantation with different prophylactic antibiotic regimens, and compared outcomes based on adherence to AUA guidelines.

Methods

Between April 2003 and May 2018, data was collected from 15 different institutions, and charts of 606 patients with diabetes mellitus (DM) receiving primary PPI were reviewed. Pre-operative antibiotic regimen was recorded for each patient and primary outcomes were post-operative infection, explantation, and revision rates.

Results

Patients had a median follow up time of 7 months (range: 0 – 157). The total number of infections, explantations, and revisions for all patients included were 23 (3.8%), 29 (4.8%), and 33 (5.5%), respectively. No patients received antibiotic prophylaxis adherent with EAU guidelines.

					95% CI	
	B	SE	P	OR	Low	High
AUA Guideline Prophylaxis	1.550	0.665	0.020	4.710	1.280	17.327
Hemoglobin A1C (cont.)	0.060	0.188	0.749	1.062	0.734	1.536
Pre-op Blood Glucose (cont.)	-0.003	0.006	0.668	0.997	0.986	1.009
Age (cont.)	-0.023	0.029	0.423	0.977	0.922	1.035
DM-Related Complications	0.852	0.522	0.103	2.344	0.843	6.515
Constant	-2.614	2.462	0.288	0.073		

The infection rate for patients treated with Gentamicin + Vancomycin (7.73%) dropped significantly when a Quinolone (1.04%) was added to the regimen, p=0.001. Similar reductions were seen with explantation (9.6% to 1.0%, $p < 0.001$) and revision (8.2% to 3.1%, $p = 0.028$) rates. Adding an anti-fungal in combination with Gentamicin + Vancomycin non-significantly lowered the infection (0%), explantation (2.9%), and revision (0%) rates.

In multivariate analysis adjusting for Age, Pre-op Blood Glucose, Hemoglobin A1C, and a history of DM-related complications, the use of antibiotic prophylaxis consistent with AUA guidelines was an independent predictor of infection (p=0.02) and explantation (p=0.041).

Conclusion

Adherence to the AUA penile prosthesis antibiotic prophylaxis guidelines confers a higher rate of device infection in diabetic patients. The high rate of infection was noted in patients receiving the most commonly prescribed antibiotic regimen of Gentamicin + Vancomycin. The AUA guidelines should be amended to reflect findings of this and other device-infection related studies.

Table 1: Demographics of groups stratified by AUA Adherence

	AUA Guideline 282		Non-AUA Guideline 324		p
	Mean	SD	Mean	SD	
Pre-op Blood Glucose (mg/dL)	139	45	150	49	0.005*
Hemoglobin A1C (%)	7.3	1.4	7.6	1.3	0.152
Age (years)	61.9	8.3	59.2	9.3	<0.001*
Body Mass Index (kg/m^2)	31.9	5.5	31.9	6.0	0.964
Duration of Diabetes (years)	9.7	7.9	11.2	9.6	0.395
Charleson Comorbidity Index	4.1	1.8	4.2	2.2	0.603
	N	%	N	%	
Infection					0.008*
0	265	94.0	318	98.1	
1	17	6.0	6	1.9	
Explantation					<0.001*
0	259	91.8	318	98.1	
1	23	8.2	6	1.9	
Revision					0.360
0	264	93.6	309	95.3	
1	18	6.4	15	4.7	

Table 2: Comparison of outcomes among antibiotic regimens

Antibiotic Regimen	N	# Infection	%	# Explantation	%	# Revision	%
Gentamicin + Vancomycin	220	17	7.7%	22	10.0%	18	8.2%
Gentamicin + Cephalosporin	62	0	0.0%	1	1.6%	0	0.0%
AUA Recommendations	282	17	6.0%	23	8.2%	18	6.4%
Non-Recommendations	324	6	1.9%	6	1.9%	15	4.7%
Other Regimens							
Gentamicin + Vancomycin + Quinolone	193	2	1.0%	2	1.0%	6	3.1%
Gentamicin + Vancomycin + Anti-fungal	35	0	0.0%	1	2.9%	0	0.0%
Vancomycin + Quinolone	45	2	4.4%	2	4.4%	7	15.6%
Cephalosporin (alone)	27	2	7.4%	2	7.4%	1	3.7%
Ampicillin/Sulbactam + Gentamicin	4	0	0.0%	0	0.0%	0	0.0%

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