

Comparison of Outcomes and Costs in Patients with Urinary Tract Infections (UTI) or Pneumonia (PNA) with Treatment Initiated in a Physician Office Infusion Center (POIC) versus Those Treated After Hospital Discharge

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Abstract

Background: Treatment of moderate infections, including UTI and PNA which require administration of IVAB, is often started unnecessarily in a hospital (hosp) setting. A POIC offers a treatment setting for initiation of required IVAB or completion of therapy post-discharge (D/C). We studied outcomes, readmissions, recurrences and costs of UTI and PNA pts treated initially in the POIC versus those treated after hosp D/C.

Methods: A retrospective, multicenter review was conducted of eligible pts treated in the POIC from Jan 1- June 30, 2011, including 30-day follow-up. Data collected included demographics, microorganisms, drug therapy, outcomes and estimated costs. Clinical success was defined as cured or improved. Pts readmitted in 30 days for recurrence were considered failed. Significant differences were determined using Fisher's exact test and Chi Square ($p \leq 0.05$ significant).

Results: 186 pts met inclusion criteria; 133 UTI and 53 PNA, with results as follows:

Outcomes (%)	UTI (n=133)		p value	PNA (n=53)		p value	Combined (n=186)		p value
	POIC Only (n=78)	Hosp D/C (n=55)		POIC Only (n=19)	Hosp D/C (n=34)		POIC Only (n=97)	Hosp D/C (n=89)	
Clinical Success	90	80	p<0.05	95	79	p<0.05	91	80	p<0.05
Readmission	3	7	NS	5	9	NS	3	8	NS
Recurrence	8	9	NS	0	12	p<0.05	6	10	NS
Adverse Events	8	7	NS	10	15	NS	8	10	NS

Clinical success was significantly higher in the POIC group than those treated following hosp D/C. Recurrence for PNA pts with therapy initiated in the POIC was significantly lower than hosp. Readmissions were due to disease exacerbation (UTI-3, PNA-5), AEs (UTI-2), or procedure (UTI-1). Drug-related AEs occurred in 18 pts, with cefepime the most frequent causative agent. There were no catheter device failures or infections. Costs were overall much less for the group initially treated in the POIC ($p<0.05$).

Conclusion: This study demonstrates a possible advantage in primary POIC management of UTI and PNA as compared to use of a POIC for post-discharge completion of therapy, with significant improvement in clinical success and cost of care, as well as recurrence reduction for PNA, in pts with treatment initiated in the POIC. Data are not controlled for variance in acuity, but the positive outcomes indicate that primary POIC management of UTI and PNA may be a superior approach to the treatment of appropriately selected pts.

Introduction

Patients who historically were treated in a hospital setting for moderate infections can be managed safely and effectively in an outpatient center (1). Outpatient parenteral antibiotic therapy (OPAT) has been shown to increase patient quality of life, reduce risk of hospital-acquired infections and reduce the cost of treatment mainly by reducing hospital bed days. More frequently, OPAT has been used to treat infections requiring prolonged antibiotic therapy such as UTI, skin infections, osteomyelitis, septic arthritis and PNA (2). We sought to report outcomes, recurrences and costs of pts treated for UTI and PNA in participating POICs across the U.S. over a specific period of time.

Methods

- Retrospective database and chart review of records from 11 POICs.
- 6-month study period: January 1 through June 30, 2011, including 30-day follow-up data.

Inclusion Criteria

- IVAB initiated at a participation POIC during the study period.
- Minimum of 2 days IVAB therapy in the POIC setting.
- Age 18 years and older.
- A documented diagnosis of UTI or PNA.
- For inclusion in the POIC-only group, the patient did not require inpatient hospitalization within 72 hours of receiving IVAB in the POIC.

Clinical Definitions

- Multiple drug resistant organisms (MDRO) were defined as organisms resistant to ≥ 3 antimicrobials.
- Adverse events (AEs):
 - Adverse event rate defined as (number of events) / (total # of patients).
- IVAB efficacy at time of POIC discharge:
 - Cure: Clinical signs/symptoms resolved, and/or no additional intravenous antibiotic therapy needed, and/or negative culture at end of therapy.
 - Improved: Partial resolution of clinical signs/symptoms, and/or a switch to oral antibiotic therapy and/or a surgical or wound care intervention was required.
 - Failed: Failure to improve on therapy, admission to the hospital for worsening infection during treatment or recurrence of infection within 30 days of treatment cessation.
- Clinical success rate defined as (Cure + Improved)/(total # of patients).
- POIC costs were calculated as a mean reimbursement rate per day. Inpatient costs, also calculated as a mean reimbursement rate were obtained from inpatient reimbursement rates from the Healthcare Cost and Utilization Project Nationwide IP sample for the applicable diagnosis and mean length of stay.

Data Analysis

- Descriptive statistics were used for demographic data.
- Percentages were used for efficacy.
- Readmissions and recurrences were evaluated with Fisher's exact statistics.
- Cost savings were calculated by comparing differences in the mean daily reimbursement for inpatients to the daily reimbursement in the POIC. The total savings were calculated based upon days of inpatient stay saved.

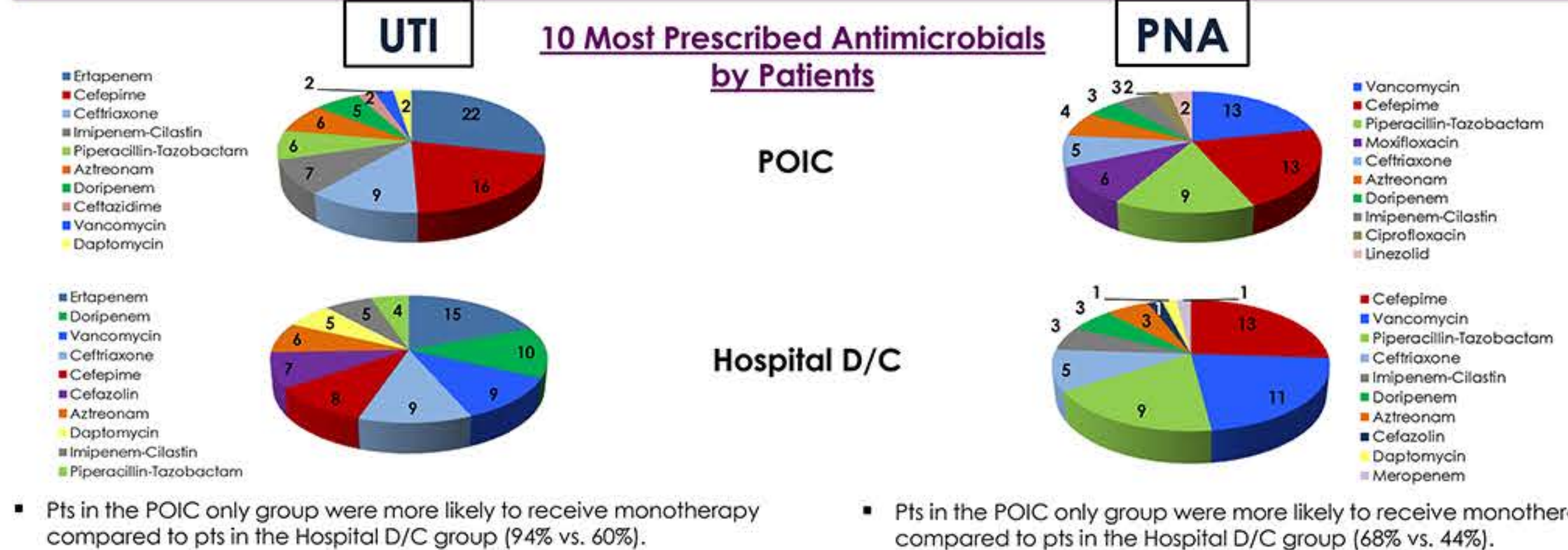
Results

Demographics

- 186 patients met inclusion criteria:

	UTI (n=133)		PNA (n=53)	
	POIC (n=78)	Hospital D/C (n=55)	POIC (n=19)	Hospital D/C (n=34)
Gender				
Male (%)	31	53	11	44
Average Age (years)				
Range (years)	67	63	60	69
≥ 65 years (%)	46 (59)	27 (49)	13 (68)	14 (41)
Length of stay (avg. days)	-	6	-	7
Co-morbidities (%)				
Smoking history	6	4	16	12
Cardiovascular Disease	26	29	37	32
Diabetes	24	31	5	21
CRF/ESRD	9	4	0	9
COPD/Asthma	12	9	37	32
CA history	26	27	42	50
Immunocompromised	6	2	26	26
Hypothyroid	17	11	32	15
Obese (BMI ≥ 30)	28	33	11	15
No. of Co-morbidities (%)				
0	8	9	-	3
1	22	14.5	-	23.5
2	21	32.7	53	17.5
≥ 3	49	43.8	47	56

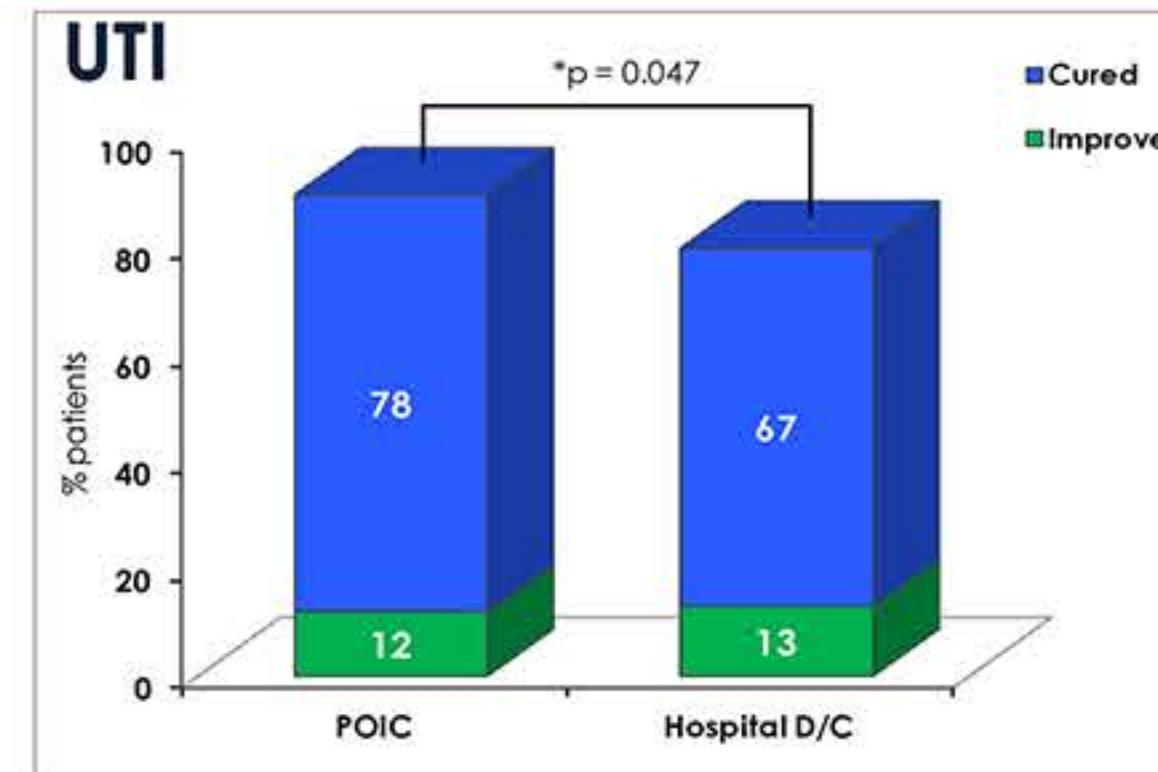
Treatment



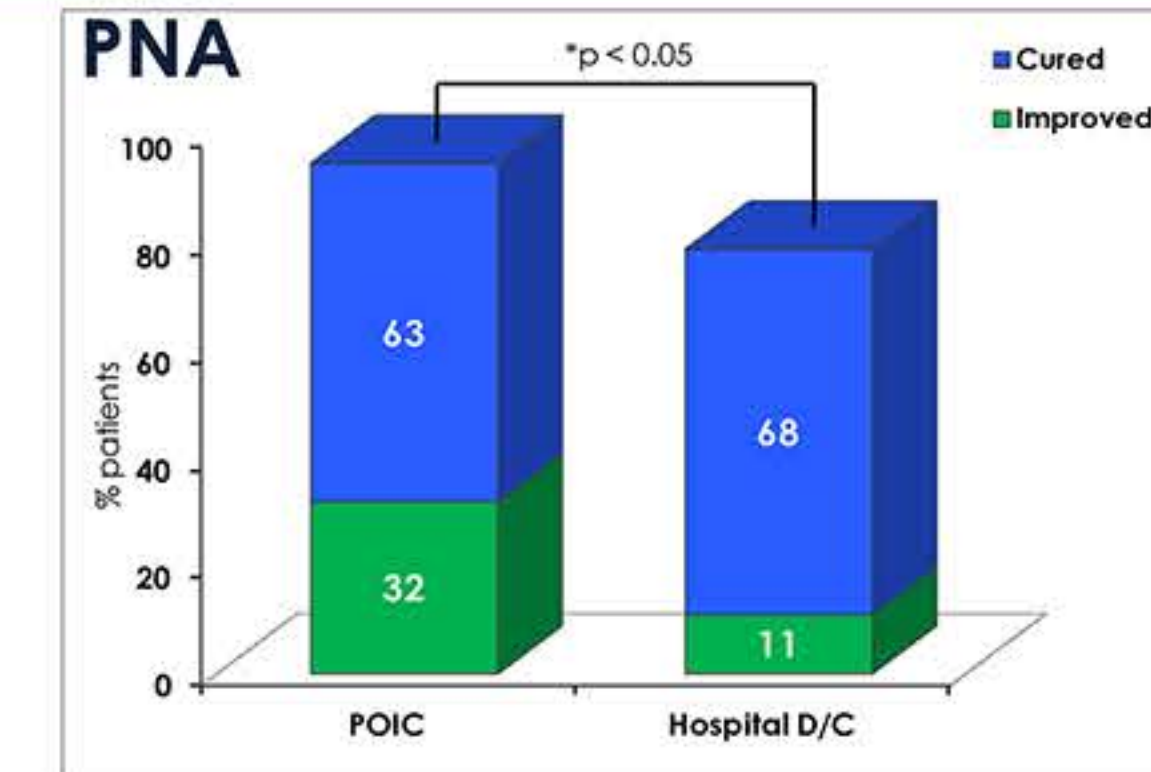
Pts in the POIC only group were more likely to receive monotherapy compared to pts in the Hospital D/C group (94% vs. 60%).

Pts in the POIC only group were more likely to receive monotherapy compared to pts in the Hospital D/C group (68% vs. 44%).

Outcomes/Clinical Success

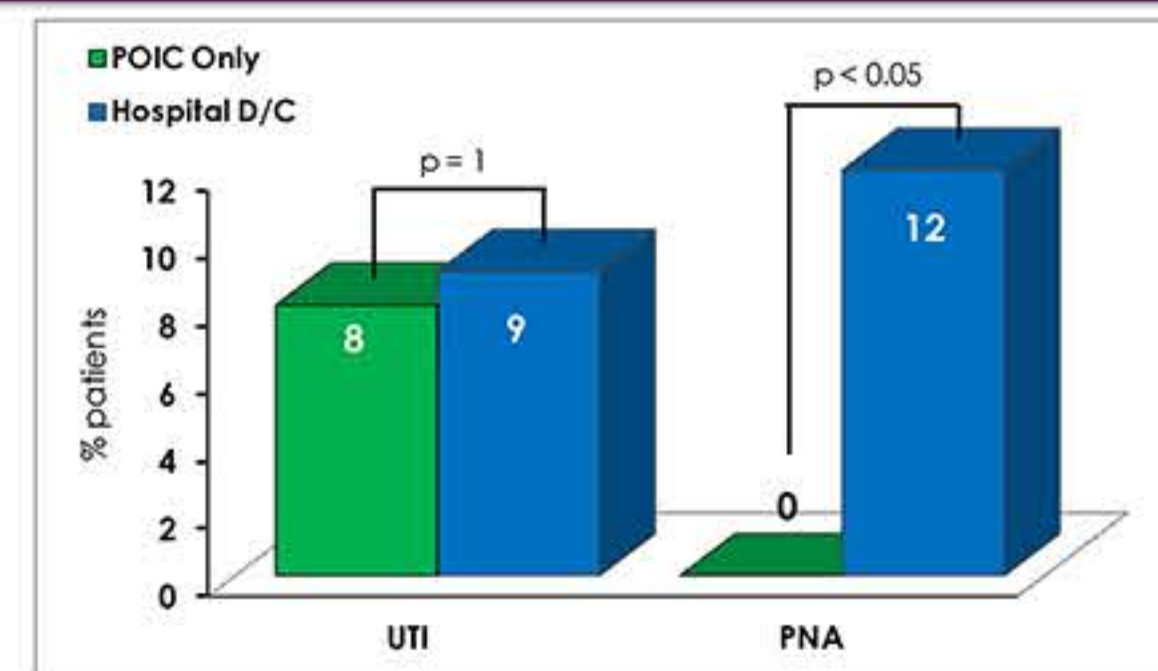


* Chi Square test with $p<0.05$ defined as statistically significant.



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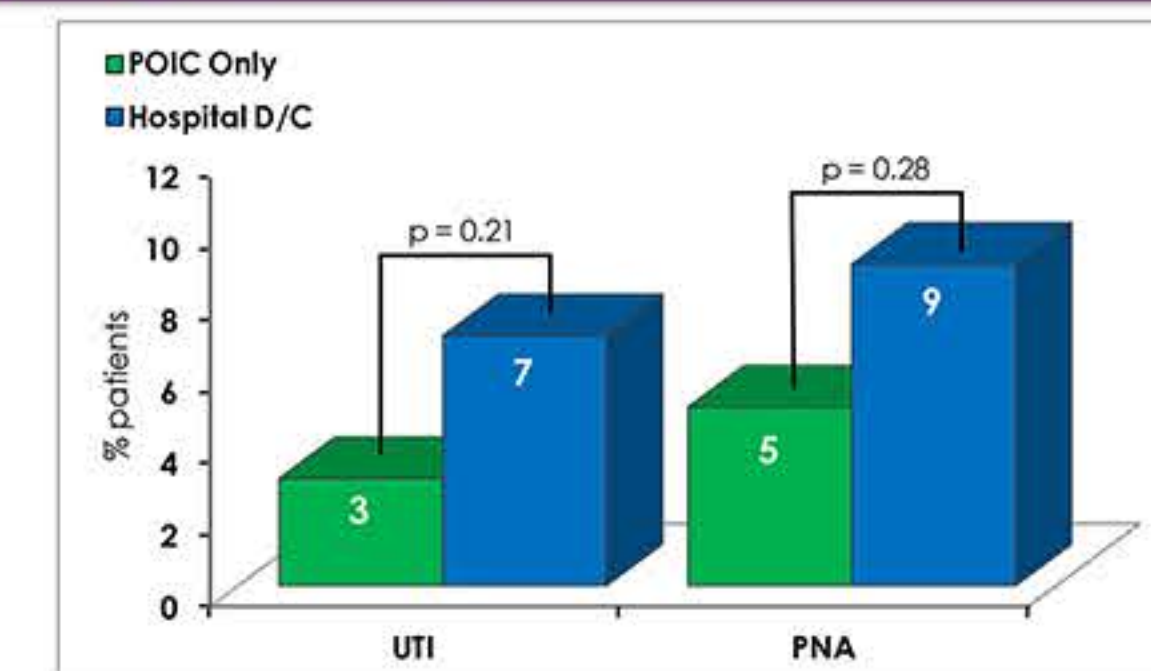
Recurrences



UTI: Recurrences for UTI were similar, with no recurrences hospitalized in the POIC group, 2 (22%) in the Hospital D/C group.

PNA: 4/34 (12%) PNA pts in the Hospital D/C group had recurrences, (statistically significant, $p < 0.05$, Fisher's test), 3 of whom were then readmitted for an average of 9 more days.

Hospital Readmissions



UTI: Pts in the Hospital D/C group were more likely to be readmitted to the hospital (7%) than pts in the POIC group (3%), however, the difference was not statistically significant ($p=0.21$, Fisher's test).

PNA: 3 PNA pts in the Hospital D/C group were readmitted to the hospital versus 1 POIC pt, however, it was not statistically significant ($p=0.28$, Fisher's test).

Adverse Events

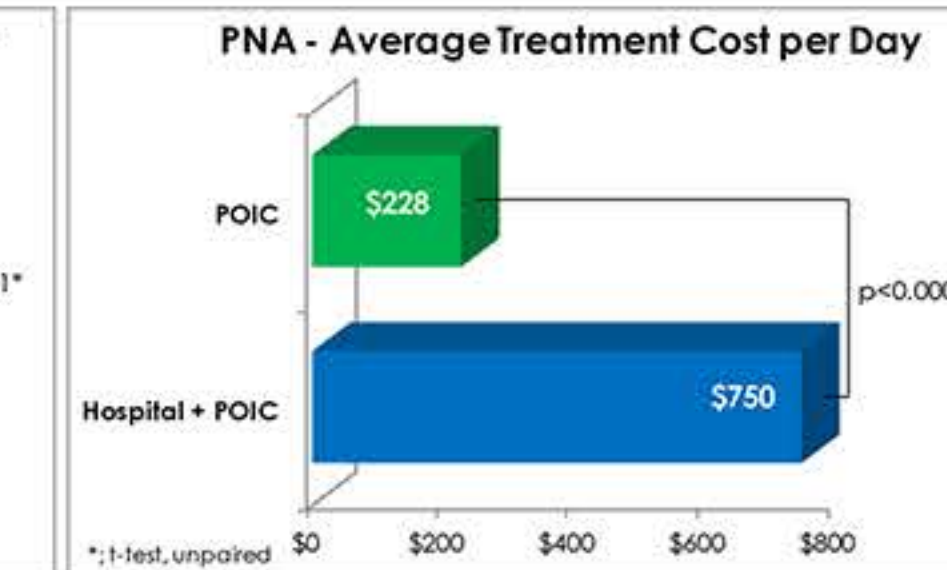
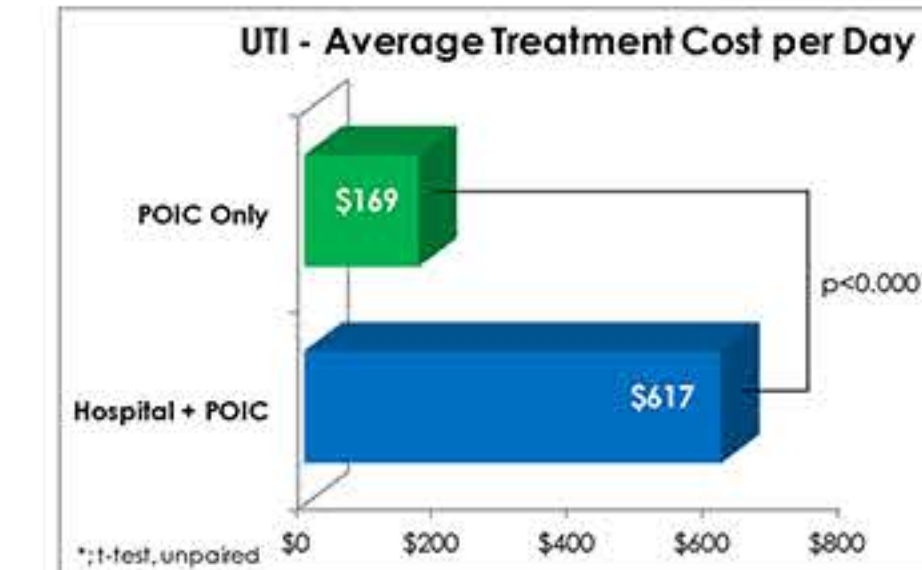
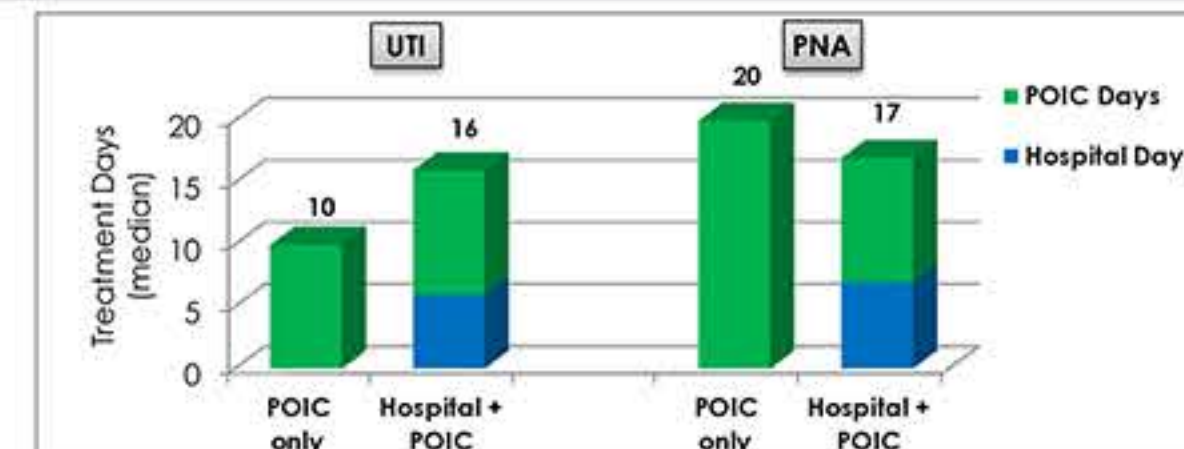
	No. of Patients			
	POIC Only	Hospital D/C	POIC Only	Hospital D/C
Diarrhea	3	1		1
Nausea/vomiting	1	2	1	1
Rash		2	1	1
Muscle pain (back/neck)	1			
Erythema/flushing				1
Fever				1
Lymphadenitis	1			
Neutropenia	1			

UTI: AEs were reported in 7 POIC, 4 Hospital D/C pts (1 pt in the POIC group vs. 4 in the Hospital D/C group required D/C of medication)

PNA: AEs were reported in 2 POIC, 5 Hospital D/C pts (1 pt in the POIC group and 3 in the Hospital D/C group required discontinuation)

Cost Savings/Length of Treatment

- UTI:** The median treatment of pts in the POIC was 10 vs. 16 days for Hosp + POIC. A substantial significant cost reduction of \$448 per day was obtained in the POIC group.
- PNA:** The median treatment with pts in the POIC was comparable to pts in the Hospital + POIC group. However, daily costs of treatment at POICs could be reduced significantly by \$522.



Conclusion and Discussion

- POIC Only and Hospital D/C patients reported similar pathogens. The UTI groups were very closely matched in all categories. The Hospital D/C group reported more MDROs than the corresponding POIC only group.
- POIC Only and Hospital D/C patients received similar antibiotics regardless of where treatment was initiated.
- Clinical success rates of 90% and 95% for treating UTI and PNA, respectively were significantly higher in POIC vs. Hospital D/C pts even with a similar incidence of MDRO and ESBL-producing organisms.
- Recurrences occurred significantly more often in PNA pts of the Hospital D/C group compared to no reports of recurrences for PNA pts at the POIC group ($p<0.05$).
- Readmission appeared to occur more often in the Hospital D/C group than in the POIC group for both UTI and PNA. However, no statistical significance was shown.
- A more than 3-fold reduction of treatment costs for UTI and PNA were achieved for pts in the POIC group indicating an statistically significant overall cost saving of \$448 per day for UTI and \$522 per day for PNA if pts are solely treated in an outpatient setting.
- In conclusion, significantly higher clinical success rates for UTI and PNA were reported with relatively small numbers of adverse events and significantly lower daily costs. These data suggest that OPAT in the POIC can be considered a cost-effective and safe treatment option and may avoid hospitalizations, recurrences and readmissions.
- A noted study limitation was the inability to match severity of illness between POIC only and Hospital D/C pts.

References

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- Craig WA. Eur J Clin Microbiol Infect Dis. 1995 Jul 14(7): 636-42.