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Full Length Research Paper

Cost Effectiveness of Outpatient Parenteral Antibiotic Therapy

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Outpatient parenteral antibiotic therapy (OPAT) refers to the administration of parenteral antimicrobial in the non-inpatient setting with the explicit aim of facilitating early discharge. Establishing OPAT service in the medical floor in a governmental hospital was a cost effective project as the cost of all the patients involved in OPAT service is 6706 $ compared with 68,090 $ an estimated cost for in-hospital treatment. The most common organism was ESBL E-Coli (Extended Spectrum Beta Lactamase Escherichia coli). The most common antibiotic prescribed was Meropenem.

Keywords: Outpatient parenteral antibiotic therapy, Home parenteral antibiotic therapy, Cost-effectiveness.

List of Abbreviation

IV: intravenous; OPAT, Outpatient parenteral antibiotic therapy; HPAT, Home parenteral antibiotic therapy; ESBL E-Coli, Extended Spectrum Beta Lactamase Escherichia coli; PICC, peripherally inserted central catheter; KPC, Klebsiellapneumoniae carba penemase; MRSA, Methicillin-resistant Staphylococcus aureus; MSSA, Methicillin-sensitive Staphylococcus aureus; UTI, urinary tract infection; BSI, bloodstream infection

INTRODUCTION

There is a growing interest in OPAT from the last century, OPAT has become a global treatment modality (Mackenzie et al., 2014) in different areas of the world (Esposito et al., 2004).

OPAT should only be considered in select patients once the active medical issues are stable and no longer require close, inpatient care. Infections commonly treated with OPAT include:skin and soft tissue infections, osteomyelitis, septic arthritis, wound infection, bacteremia, endocarditis, meningitis, pneumonia, urinary tract infection (UTI)/pyelonephritis and intra-abdominal infection (Bowling et al., 2013).

OPAT allows patients to have a more normal life, saves money, appears to be safe (Antoniskis et al., 1978) and leads to an increase in the available bed days in the hospitals (Swenson et al., 1981).

There are three basic models for outpatient parenteral therapy: these are the visiting nurse model, the infusion center model and the model for self administration. The last model is significantly lower in cost than the others because of savings in healthcare personnel and overhead expenses. The obvious disadvantages include the lack of medical knowledge on the part of the patient

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Table 1

	Organism	Diagnosis	Antibiotics	Duration in days	IV access
1	KPC	UTI	Colistin	4	IV cannula
2	ESBL E-coli	UTI	Meropenem	7	IV cannula
3	Pseudomonas aeruginosa	BSI	Ceftazidime	8	IV cannula
4	ESBL E-coli	UTI	Meropenem	13	IV cannula
5	MRSA	Thrombophlebitis	vancomycin	14	IV cannula
6	MRSA	Septic arthritis	Teicoplanin	17	PICC line
7	MRSA	BSI	Vanomycin	19	PICC line
8	ESBL E-coli	Line sepsis	Meropenem	5	IV cannula
9	ESBL klebsiella	UTI	Meropenem	5	IV cannula
10	E-coli	Cholangitis	Ceftriaxone	7	IV cannula
11	ESBL E-coli	BSI	Meropenem	3	IV cannula
12	MSSA	BSI	Cefazolin	7	IV cannula
13	Strptococcuspneumoniae	Meningitis	Vancomycin and Ceftriaxone	5	IV cannula
14	ESBL E-coli	UTI	Meropenem	14	IV cannula
15	ESBL E-coli	Wound infection	Meropenem	32	PICC line
16	ESBL E-coli	UTI	Meropenem	14	IV cannula

(BSI) bloodstream infection
(UTI) urinary tract infection

or family members, a lack of medical supervision and minimal availability of medical equipment (Tice et al., 1995).

PATIENTS AND METHOD

OPAT service

OPAT service has been started in February 2015 for 1 year as an infusion room with one bed in the medical unit that serves only medical inpatients. The service run by the house staff doctors, nurses and pharmacist. Patients included are adult medical inpatients who are clinically stable and ready for discharge but kept only for completion of IV antibiotics course. Patients should agree, has a cooperative family, an easy transportation and a working telephone number for communication. The antibiotic frequency for OPAT service was not more than 3 times per day and preferably once or twice daily. IV cannula was used for courses shorter than 14 days and PICC (peripherally inserted central catheter) line was used for the longer courses or patients with a very difficult venous access. IV cannula should be changed every 72 hours as per our hospital policy and if it was blocked. Patients were given clear instructions by the doctors about the care of the IV cannula or PICC line. At the end of the course the IV cannula or PICC line must be removed in the infusion room or in our emergency department or in the case of accidental removal or if any sign of infection developed.

Data collection

Retrospective record review of OPAT service for the organisms, antibiotics used, treatment course and the IV access.

Economic evaluation

Number of hospital bed days saved by OPAT service.

The cost of the patient involved in OPAT service compared with an estimated cost of for in-hospital treatment.

RESULTS

Patient's demographics

A total of 16 patients involved in OPAT service. The shortest duration is 3 days and the longest is 32 days. 3 patients (18.75%) was given the antibiotics through PICC line and 13 (81.25%) through the IV cannula.

Different diagnoses treated in our OPAT service, the most common diagnosis is UTI in 6 patients (37.5%) followed by bloodstream infection (BSI) in 4 patients (25%). Figure 1.

The most common organism is ESBL E-coli (43.75%) followed by MRSA (18.75%) (Figure 2) and the most common antibiotic prescribed is Meropenem (Figure 3). A total number of bed days saved through establishing OPAT service is 174 days in the project duration of 1

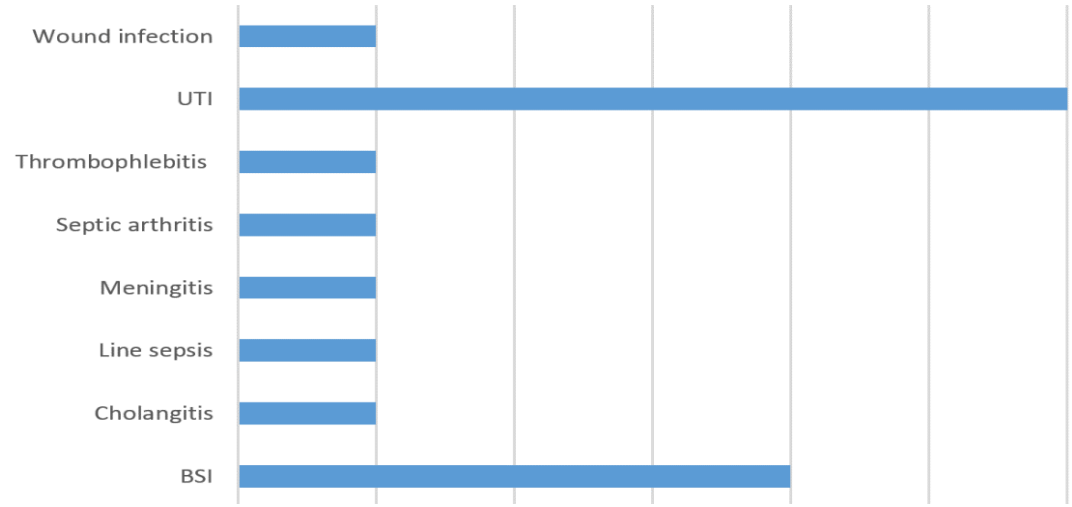

Figure 1. Diagnoses of the patients in OPAT service.

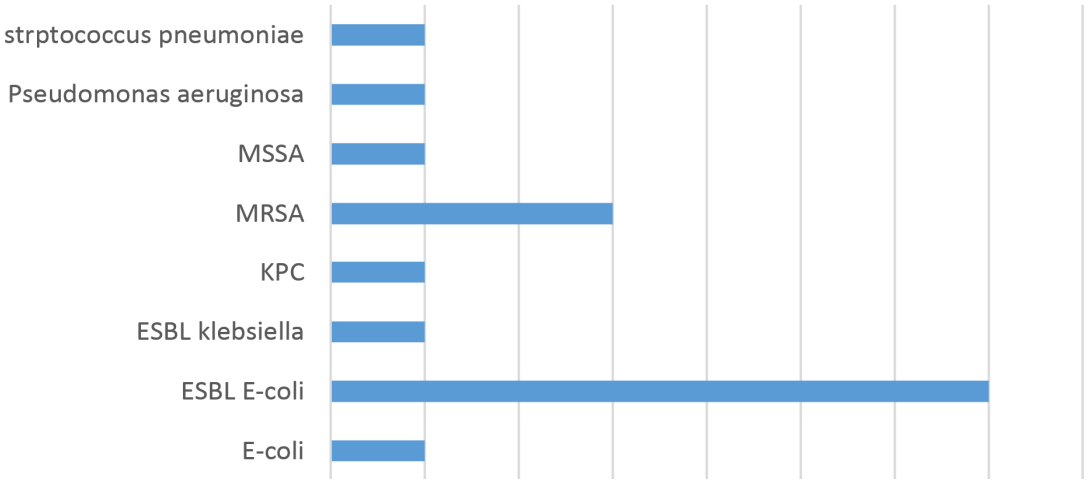

Figure 2. Organism in patients of OPAT service

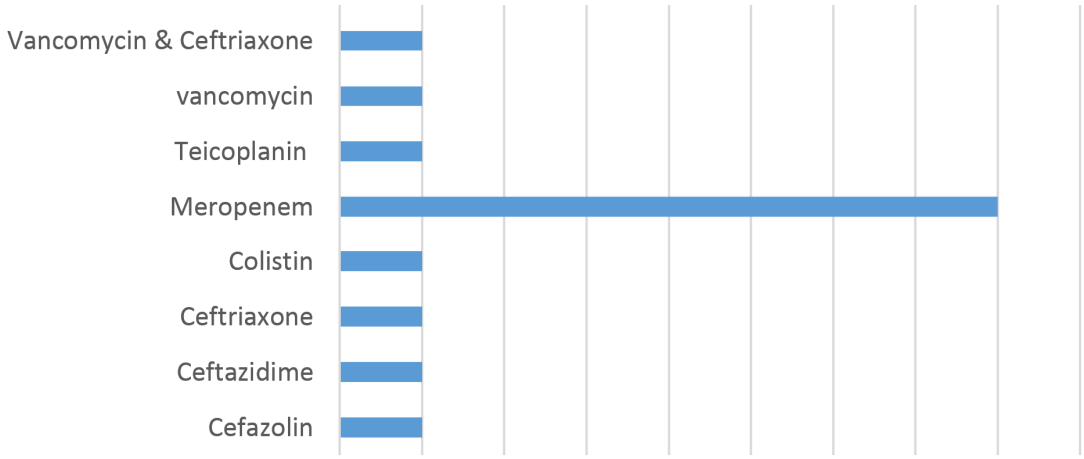

Figure 3. Antibiotics prescribed in patients of OPAT service.

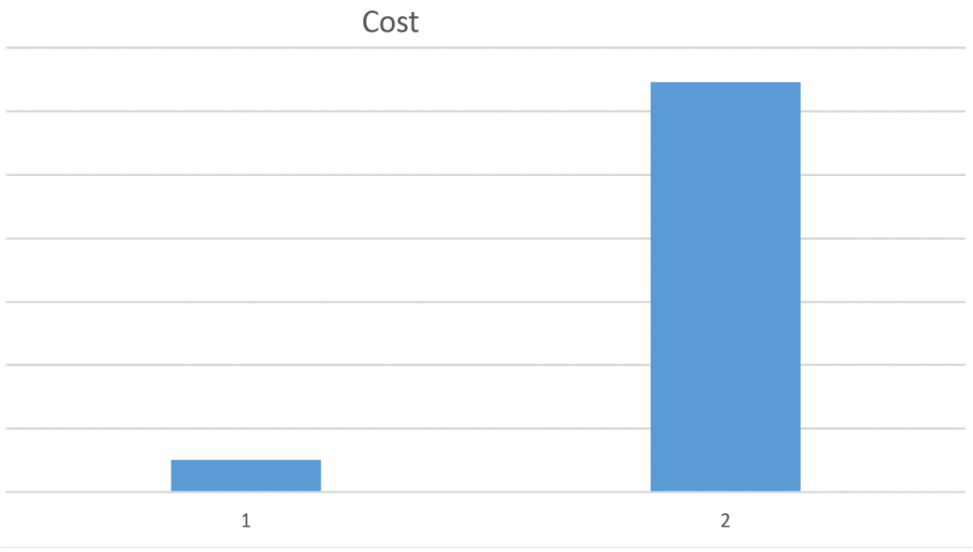

Figure 4. Column no.1: total cost of OPAT service.
Column no.2: total cost of the patients antibiotic course in-hospital.

year (47.67%). The cost of all the patients involved in OPAT service is 6706 $ compared with 68,090 $ an estimated cost for in-hospital treatment, OPAT cost is only 9.84% of the inpatient stay cost for the antibiotics. This intervention saved the hospital 90.16% of the cost. (Figure 4)

DISCUSSION

In our governmental hospital with increasing admission load and bed shortage, discharging the patients safely is a target that led us to try OPAT service. We know that we need such service but after trying it in our institute even in a narrow spectrum, we realized the great importance of such intervention.

This service doesn't help only the institute but also it provides help to the patients as they will be able to return to work and continue their antibiotic therapy (Rehm et al., 1983). Patient productivity is an important indirect cost that was not addressed in our study.

Treatment of a wide variety of infectious diseases, that had previously required hospitalization for up to several weeks in order to administer parenteral antibiotics, has been shown to be safely administered on an outpatient basis. Numerous clinical studies have demonstrated that the administration of IV (intravenous) antibiotics on an outpatient basis to selected patients is safe, cost-effective and practical, and can reduce overall health-care expenditure (Poretz et al., 1998) and we get similar results in our study.

OPAT service has another important advantage that was not addressed in our study, It has been reported that the risk of nosocomial infection and the chances of acquiring an antimicrobial-resistant organism while receiving OPAT appear to be lower (Graham et al., 1991).

Running APOT service lead us to think of home parenteral antibiotic therapy (HPAT), a variety of external factors (patient transport, clinic attendance and mobility issues) that could present as problems to an OPAT patient.

HPAT is very well known and the literature is rich in data. Most hospitals provide hospital-centered nursing outreach programs to patient homes for the administration of antibiotics which allows daily direct supervision of the patient. However, the nursing costs in this model can be significant. Self-administration of intravenous antibiotic therapy involves training the patient or their carer to administer parenteral antibiotics that are pre-packaged ready for use with ambulatory devices. The reduction in nursing costs and increased patient autonomy are advantages of this model, although adequate patient or carer training is essential to facilitate drug administration in a safe and effective manner with minimal complications (Subedi et al., 2015).

In establishing a home antibiotic delivery program using infusion devices, a comprehensive training program is essential for all health care professionals involved. The use of an infusion device requires an experienced pharmacy and nursing staff. The clinician must be familiar with the programming of the device, the stability of medication at room and refrigerated temperatures, and the appropriate drug concentrations used in administration, as well as know about drugs that are potentially irritating to the peripheral veins. A thorough knowledge of the wide variety of central venous access catheters is important. There was no increased cost for

nursing charges since only one visit per day was required, irrespective of the frequency of antibiotic administration (New et al., 1991). In patients with cystic fibrosis with frequent exacerbations, home treatment minimizes these costs and risks. The benefits of intensive hospital-based treatment must be weighed against the costs, both economic and in terms of inconvenience to the patient. In addition, there is a danger of cross-infection in the hospital environment (Pond et al., 1994).

Our study has the following limitations: retrospective design, single center experience and indirect cost i.e.; patient productivity was not assessed. Another limitation is the small sample size as patient transport, and mobility issues present important problems to the patients and patient's preference was a priority.

In conclusion, Our study demonstrates that OPAT is safe and cost effective. OPAT results in lower direct costs when compared to completing the course as an inpatient. A variety of external factors patient transport, clinic attendance and mobility issues presents problems to an OPAT patient. There is a great need for the HPAT.

REFERENCES

Antoniskis A, Anderson EC, Van Volkinburg EJ, et al (1978). Feasibility of outpatient self administration of parenteral antibiotics. West J. Med. 128: 203-206.

Bowling JE, Lewis JS, Owens AD (2013). Outpatient Parenteral Antimicrobial Therapy. *Hospital Med. Clin. 2*(1): e45–e56. http://doi.org/10.1016/j.ehmc.2012.07.002

Esposito S, Noviello S, Leone S, Tice A, Seibold G, Nathwani D, Scaglione F (2004). Outpatient parenteral antibiotic therapy (OPAT) in different countries: A comparison. *Int. J. Antimicrob. Agents. 24*(5): 473–478.

Graham DR, Keldermans MM, Klemm LW, Semenza NJ, Shafer ML (1991). Infectious complications among patients receiving home intravenous therapy with peripheral, central, or peripherally placed central venous catheters. Am. J. Med. 91(3B):95S–100S.

Mackenzie M, Rae N, Nathwani D (2014). Outcomes from global adult outpatient parenteral antimicrobial therapy programmes: A review of the last decade. *Int. J. Antimicrob. Agents*. *43*(1): 7–16.

New PB, Swanson GF, Bulich RG, Taplin GC (1991). Ambulatory antibiotic infusion devices: Extending the spectrum of outpatient therapies. *The Am. J. Med. 91*(5): 455–461. http://doi.org/10.1016/0002-9343(91)90180-6

Pond MN, Newport M, Joanes D, Conway SP (1994). Home versus hospital intravenous antibiotic therapy in the treatment of young adults with cystic fibrosis. *Eur. Respir. J. 7*: 1640–1644.

Poretz DM (1998). Evolution of outpatient parenteral antibiotic therapy. *Infect. Dis. Clin. North Am. 12*(4): 827–834. http://doi.org/10.1016/S0891-5520(05)70022-2

Rehm SJ, Weinstein Al (1983). Home intravenousantibiotic therapy: a team approach. Ann. Intern. Med. 99: 388-392.

Subedi S, Looke DFM, McDougall DA, Sehu MM, Playford EG (2015). Supervised self-administration of outpatient parenteral antibiotic therapy: A report from a large tertiary hospital in Australia. *Int. J. Infect. Dis. 30*: e161–e165. http://doi.org/10.1016/j.ijid.2014.11.021

Swenson JP (1981). Training patients to administer intravenous antibiotics at home. Am. J. Hosp. Pharm. 38: l-1483.

Tice AD (1995). Experience with a physician-directed, clinic-based program for outpatient parenteral antibiotic therapy in the USA. *Eur. J. Clin. Microbiol. Infect. Dis. 14*(7): 655–661. http://doi.org/10.1007/BF01690748