Tetanus and use of magnesium in resource limited country

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Background: Tetanus is a nervous system disorder characterized by muscle spasms that is caused by the toxin-producing anaerobe, Clostridium Tetani. It is almost obsolete disease in developed country but one of the most neglected diseases in developing country.

Methods & Materials: Case series, Here we describe the 320 cases of diagnosed tetanus cases admitted in Infectious unit of Mymensingh Medical College Hospital during the period of 3 year from July 2011 to July 2014.

Results: Median age of the patient was 40 (R-3-70) years and 264(82.5%) were male; outnumbered were female. Most 95%(304) patients were from rural area and 65%(208) had family income around 100 US$/month. Clinical pictures revealed almost all (95.7%) had lock jaw, pain in the neck and back. About 47.8% patients had resus sardonicus and 28% had opisthotonus. 87% had both upper and lower limb spasticity. One hundred twenty four (38.75%) had history of wound in lower limb, 21.6% (69) had upper limb and 20 had history of CSOM, 10 had incomplete abortion, 16 had due to surgical complication. Large number of patients(81) failed due to surgical complication. Lagrange (304) patients were from rural area and 65%(208) had family income around 100 US$/month. Most 95%(304) patients were from rural area and 65%(208) had family income around 100 US$/month. Clinical pictures revealed almost all (95.7%) had lock jaw, pain in the neck and back. About 47.8% patients had resus sardonicus and 28% had opisthotonus. 87% had both upper and lower limb spasticity. One hundred twenty four (38.75%) had history of wound in lower limb, 21.6% (69) had upper limb and 20 had history of CSOM, 10 had incomplete abortion, 16 had due to surgical complication. Large number of patients(81) failed due to small subpopulation of microbial cells, called persister cells. Persister cells have ability to survive even at lethal dose of antibiotics known as multidrug tolerance. The molecular mechanism of persister cell formation is unknown and not well understood but it is well established that toxin-antitoxin systems play a key role in the formation of same. Currently available therapeutic strategies are not able to treat or eradicate chronic infections. Researchers found three gene loci in the genome of Pseudomonas aeruginosa codes for toxin-antitoxin proteins. Certain metabolites if given in combination of antibiotics, they can treat persister cells more efficiently. The identification and evaluation of toxin-antitoxin genes can provide a clue to develop new strategies for treating pathogens. The study of various metabolites effects in combination with antibiotics on persister cell can lead to development of new antipersister therapy for treating chronic and latent infections.

Methods & Materials: Persister Cell Assay (Antibiotic based): Culture of P. aeruginosa, ampicillin & LB-Agar. Persister Cell Assay (Green fluorescent protein based): Arabinoise inducible green fluorescent protein containing vector. Protein-Protein Blast: Putative toxin-antitoxins operon from the genome of P. aeruginosa using NCBI server. Phylogenetic Analysis: Different annotated protein sequences were multiple aligned and phylogenetic trees were constructed by using CLC Genomics Workbench (version 5.5 software).

Results: Please find attachments
Conclusion: This experiment revealed a small subpopulation of cells that remain alive irrespective of concentration of antimicrobial agents. In exponential phase the number of persister cell was lower than stationary growth phase populations. In addition, the persister cells of *P. aeruginosa* exhibit a high tolerance to the variety of antibiotics, and phenotype was not inherited as tested with four passages of *P. aeruginosa* populations. *In-silico* results show the presence of *parDE*, *relBE*, and *higBA* toxin-antitoxin systems among which *ParE* toxin generates double strand breaks while *RelE* & *HigB* toxins induce mRNA cleavage.

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**Impact of antimicrobial stewardship in collaboration with infection control on hospital-acquired infection rates in a subspecialty cancer treatment facility**

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**Background:** Antimicrobial stewardship programs (ASP) in collaboration with infection control have been shown to reduce rates of hospital-acquired infections (HAI) and prevent development of resistant organisms. ASP ensures the medical staff is appropriately educated on protocols developed by infection control and monitors the use of antibiotics to reduce the risk of *C. difficile* and other multi-drug-resistant organisms. These services are imperative in hematology/oncology patients who are at elevated risk for acquiring HAIs due to immunosuppression, chronic intravenous access, and frequent hospitalizations. We sought to determine if ASP in combination with infection control could reduce HAIs in a subspecialty oncology hospital.

**Methods & Materials:** We performed a retrospective review of HAIs between January 2012 and September 2015. Antimicrobial usage from July 2011 through September 2015 and antimicrobial susceptibility data from December 2010 through November 2014 was collected. During this time, ASP and infection control strategies included: nursing education on appropriate methods of accessing ports and management of foley catheters, adherence to strict hand-hygiene protocols, consultation by the infectious disease physician, and daily review of all patients on antimicrobial agents by the infectious disease pharmacist.

**Results:** In a 74-bed subspecialty cancer treatment facility with oncology and stem cell transplant patients, ASP was established in 2012. Since inception, the rate of central line-associated bloodstream infections (CLABSI) steadily declined and was maintained below the national pooled mean since May 2013 (Figure 1). Additionally, no incidences of CLABSIs were reported for 1 year (January 2014 through February 2015). Due to the low usage of meropenem and imipenem (24 and 29 days of therapy per 1,000 patient days respectively) between August 2011 and September 2015, there have been only 3.2 isolates per 1,000 patient days identified of *Carbapenem-resistant Enterobacteriaceae*. Additionally, rates of HAI MRSA and *C. difficile* remained extremely low (0.18 and 0.2 infections per 1,000 patient days, respectively) after ASP was implemented.

**Conclusion:** Through education, implementation of specific protocols, and ASP interventions, the risk of hospitalized hematol-