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 CID, Faculty of Health Sciences, Tygerberg, Stellenbosch University

~Bugs Life~ wishes all our readers a blessed 2008. In this issue we publish the remaining abstracts of the successful CID research day in November 2007. CID is planning at least three events in 2008 as part of the lectures series "Expert Opinion on Infectious Diseases". This will further stimulate discussions and networking.

Pulmonary Tuberculosis at Tygerberg Hospital, Western Cape, South Africa, a quantitative and qualitative assessment

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Objectives were to analyse data of patients with pulmonary tuberculosis (PTB) at Tygerberg Hospital (TBH), assess existing TB-containment practices by qualitative methods and make recommendations to the hospital management of how to improve TB-control measures.

Design: Cross-sectional survey

Setting: Tertiary hospital, Western Cape, South Africa

Participants were PTB-patients with positive specimen sent to Microbiology between November 1st 2006 and April 30th 2007 and 20 randomly selected nurses, ten dealing with TB on a daily basis, ten not.

Results: Of 394 patients diagnosed with pulmonary tuberculosis (PTB), 54% were HIV-co-infected and 9.3% had multi-drug-resistant (MDR) strains. The prevalence of inpatients with PTB was 1,300/100,000, their crude death rate 11.4%. Independent risk factors for HIV-co-infection were female sex (OR: 2.39, $p=0.00243$), age 17-32 years (OR: 2.37, $p=0.00275$) and black ethnic origin (OR 3.61), $p=0.00001$). Infectious PTB-inpatients ($n=276$) stayed an average of thirteen days (median 9, SD ± 14.845 , range 144) and were on average transferred twice (range: 7). The notification rate of 14.2% was unexpectedly low. Nurses in the sample have educational deficits in their work with TB-patients, especially those without TB-routine. A trend indicates TB being associated with fear, concerns and stigma. TB-containment practices are inconsistent, even on wards with TB-routine. The risk of TB-transmission at TBH is estimated to be high.

Key findings: In a tertiary hospital with high burden of PTB and HIV, there are inconsistent practices of how to contain TB-transmission and a system failure in the reporting of PTB. Recommendations are made of how to improve conditions.

Special Interest:

- Pulmonary TB at TBH
- Barriers to ART adherence in Africa

Highlights on page 2:

- Water pollution due to failing sanitation
- Hyperlactatemia and lactic acidosis: AZT substitution for d4T
- Vitamin D receptor gene polymorphisms and pulmonary TB

Social and Structural Barriers to ART Adherence in Africa

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A recent meta-analysis co-authored by Dr. Nachega and published in the Journal of American Medical Association, was selected by *The Lancet* as among the most important article of 2006, compared the proportion of adherent patients in African studies with those in North American cohorts. The overall analysis showed a favorable proportion of 77% of patients who were highly adherent among African cohorts versus 55% of patients who were adherent to treatment in North American studies. However, Dr. Nachega cautioned that this is no reason for complacency in Africa as these were short studies in highly selected populations using less complicated regimens. Dr. Nachega also made it clear that there are still many issues to combat as treatment is expanded. He showed that some of the reasons for nonadherence in Africa differ from those in North American cohorts and include cost, lack of stock of antiretroviral therapy, alcohol abuse and fear of stigmatization after disclosure to sexual partner. He emphasized the necessity of research to investigate community-based interventions to maintain high level of adherence for patients with optimal adherence rates and to increase adherence in patients who are struggling to poor adherence such as those who abuse alcohol and have fear of HIV status disclosure due to stigma surrounding HIV/AIDS.

Water pollution due to failing sanitation

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Informal settlements near natural watercourses cause river pollution that has severe water quality implications for health and downstream water use. Many inhabitants in dense settlements have poor access to toilet facilities and they use a container for excreta and sullage and empty this into the stormwater drains leading to the river. The sewage pollution levels in many rivers of the Boland reach very high levels during summer. *E. coli* levels are used in its traditional role as an indicator of faecal pollution, but also as a monitoring index of eventual environmental effects of sanitation education and interventions into the functioning of the sanitation systems of urban areas and informal settlements in particular. The rivers of the area are in danger of serious pollution, especially with untreated sewage. This pollution emanates mainly from two types of sources - informal housing areas without proper sanitation services and systemic failures of the wastewater treatments works and sewerage systems of many towns in the area. Examples of such problems, their interlinked nature and the impact of such pollution were presented. With a situation fitting the description of a slow disaster already in existence, this greatly increases the vulnerability of the population to outbreaks of serious disease should a sudden disaster such as an earthquake strike the region. Disaster management structures should take note of the situation and act timeously to prevent the situation from deteriorating further. The studies over the past 8 years highlighted the contribution of environmental pollution due to poor infrastructure of sanitation services and poor maintenance of such services, even in settlements where the inhabitants are supplied with clean water. It dispels the myth that provision of clean water alone can significantly address the prevalence of diarrhoea in dense settlements. The economy of the Cape winelands rests mainly on two pillars: agricultural production and tourism. The latter is to a great extent depending on the former, with wine and fruit production the main link, as well as the scenic beauty of the area. Such an area is vulnerable to market perceptions regarding serious pollution, both for local and overseas markets as well as for tourism. A plea is made for increased attention to public health and sanitation problems in particular as well as an increased awareness of the enormous impact of environmental pollution on the burden of infectious disease, notably

Symptomatic hyperlactatemia and lactic acidosis: Incidence, Gender and BMI as risk factors, frequency of symptoms, outcomes and safety of AZT substitution for d4T.

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Background: Higher incidences of symptomatic hyperlactatemia (SHL) and lactic acidosis have been reported in South Africa where dideoxynucleosides are used as nucleoside backbones for HAART in the public sector. This study reviews the incidence, gender and BMI as risk factors, analysis frequently reported symptoms and documents outcomes of SHL.

Method: Retrospective cohort analysis was performed of 1175 adults (66.5% female) who started on ART from January 2004 to January 2007 at the Tygerberg Hospital Adult Infectious Diseases Clinic. All patients with two lactate levels of > 2,5mmol/l and symptoms compatible with SHL during the study period were included in the analysis.

Results: A total of 79 patients presented with SHL (65 female). The overall incidence was 42 cases per 1000 patient-years. The incidence among female patients was 36.1 cases per 1000 patient-years compared to 6.1 cases per 1000 patient-years on treatment among male patients. 46 patients (58%) had lactate measurements of > 5mmol/l giving it and incidence of 24, 5 cases per 1000 patient-years. Two patients (2, 5%) died. Median age was 37 years, median baseline CD4 102 and median duration of ART was 11 months. The baseline median BMI was 24, 1 compared with a median baseline BMI 22. 3 calculated from a control group of 354 patients. 17 (23, 6%) of 72 patients with SHL were obese (BMI > 30). All 79 patients were on d4T and 2 were switched to AZT prior to developing SHL. Most frequently reported symptoms were weight loss (61%), nausea and vomiting 58 %, abdominal pain or tenderness 55% and peripheral neuropathy occurred in 51% of patients. Treatment was interrupted in 51 patients where as treatment was continued and AZT was substituted for d4T in 26 patients. Of the 70 patients restarted or continued with AZT only 1 patient developed a recurrence. **Conclusion:** A higher incidence was found as the cohort included the entire spectrum of SHL. The frequency of SHL was higher among women. AZT seems a safe alternative where NRTI options are limited. These findings mirror results found in other South African cohort in the public sector ARV roll-out program.

The influence of vitamin D receptor gene polymorphisms on time to sputum conversion in patients with pulmonary tuberculosis

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The vitamin D receptor (VDR) gene may be involved in susceptibility to TB, and may also influence the host response to *Mycobacterium tuberculosis* infection during treatment. Firstly, a case-control association study of 249 TB cases and 352 healthy controls was carried out on a South African admixed population to investigate association of VDR polymorphisms *FokI*, *Apal*, and *TaqI* with TB susceptibility. Secondly, a cohort of pulmonary tuberculosis (PTB) patients with conversion times for sputum smear (n=220) and culture (n=222) were analysed to determine factors, including VDR genotypes, gender, age, smoking, extent of TB as determined by chest radiograph at diagnosis (right upper lobe, RUL), that contributed to mycobacterial resolution in sputum. Age and gender adjusted Cox regression models were constructed, both individual and optimal models, with various other factors to assess their impact on conversion time. VDR genotype (*Apal*) contributed independently in the optimal models for both smear and culture conversion time, with the 'AA' genotype predictive of a faster conversion time (p=0.02-0.04). The extent of TB at diagnosis also impacted the time to conversion independently in both models. Smear conversion time could be independently predicted by smoking status (p=0.03) and the *TaqI* genotype (p=0.02-0.04), with the 'tt' genotype associated with slower response to TB chemotherapy. We did not find an association between VDR genotype and TB in the case-control study. The time taken for an individual to convert to sputum negativity while on antituberculosis therapy, can be independently predicted by the VDR genotype and the extent of PTB at diagnosis. This may have implications for future immunomodulatory therapies.