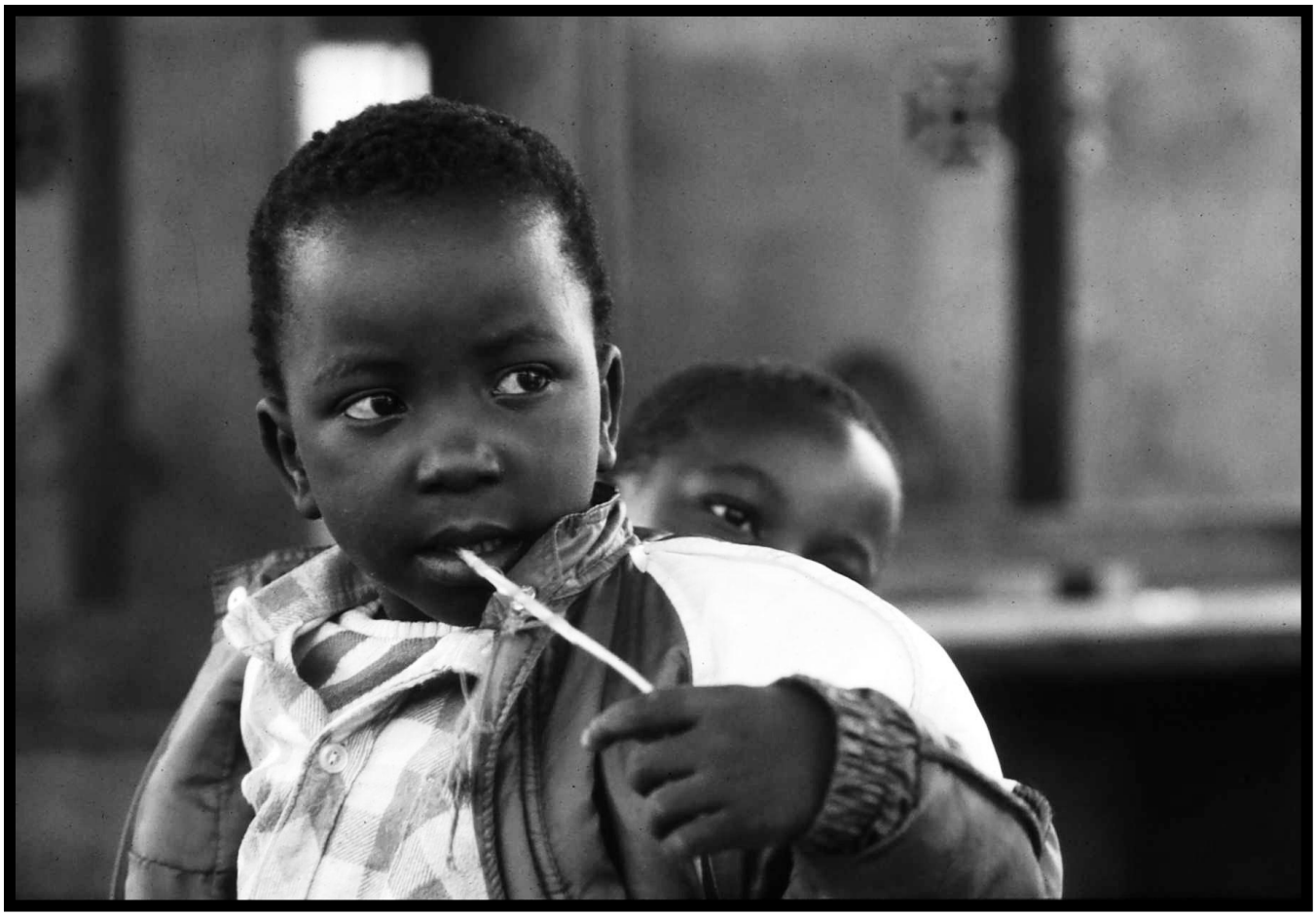
SCHOOL OF CHILD & ADOLESCENT HEALTH

UNIVERSITY OF CAPE TOWN

ANNUAL RESEARCH DAYS 2009



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Programme and Abstract Book

27 & 28 October
Nursing Education Function Hall, Johnson & Johnson Building
Red Cross Children's Hospital

CPD Points

Tuesday, 27 October 2009 ***4 points***
Wednesday, 28 October 2009 ***7 points***

Please sign the attendance register on both days to claim your points.

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Title: **SHORT TERM OUTCOME OF INFANTS BORN TO MOTHERS INFECTED WITH NOVEL H1N1 INFLUENZA A AT GROOTE SCHUUR HOSPITAL**

Authors: Y Joolay, A R Horn, C H Pieper and M C Harrison

Department: Neonatal Medicine, Department of Paediatrics, University of Cape Town

Background:
H1N1 Influenza A is a new strain of influenza that has rapidly progressed to a pandemic. There is an increased risk of complications and mortality due to H1N1 Influenza A in pregnant women in their second and third trimesters. Very little is known about influenza in the neonatal period. The use of Oseltamivir for prophylaxis and treatment in neonates is not well documented and current recommendations are based on scanty evidence.

Objectives:
1. To document the course of neonates born to mothers known to be infected with H1N1 Novel influenza in the peripartum period
2. To determine the use of prophylactic treatment with Oseltamivir in exposed infants

Design/Methods:
A prospective database was kept of infants born to mothers who were concurrently confirmed to be infected with the H1N1 strain of influenza A at Groote Schuur Hospital over a one month time period. A number of infants were treated with Oseltamivir. Infants were monitored for signs of respiratory infection. Where infection was suspected investigations were done to exclude H1N1 influenza. Well infants were followed up for 2 weeks.

Results:
There were 10 infants who were identified as being born to H1N1 positive mothers. 3 of the infants were term and 7 were preterm. Of the 10 infants, 7 were LBW or VLBW. 2 received Oseltamivir after developing signs of respiratory illness. Investigations for H1N1 were negative in these 2 patients. None of the patients who did not receive Oseltamivir infants developed any signs of illness.

Conclusions:
The safety profile of prophylactic Oseltamivir in neonates has not been adequately established. In this small observational study, none of the infants born to H1H1 infected mothers displayed evidence of H1N1, irrespective of the use of Oseltamivir. We suggest that further studies are required to:
1) Determine both safety and efficacy of Oseltamivir in neonates born to H1N1 infected mothers
2) Whether Oseltamivir is required in infants born to mothers known to be infected with H1N1 Novel influenza

Title: **A DECADE OF HOSPITAL DEATHS: WHAT HAS CHANGED?**

Authors: A Westwood.

Objectives:
In 2006 we published a 5 year investigation into the causes of death of patients who died under the care of the Red Cross War Memorial Children's Hospital (RCCH) in Cape Town (1). A rising number and rate of deaths due to HIV/AIDS was a prominent aspect of this review. Since then changes have taken place in the prevention and management of this disease, as well as significant demographic shifts and health service reform in Cape Town. This audit took the study of deaths at this hospital further over the subsequent 5 year period to ascertain what changes had taken place.

Methods:
Information has been routinely collected on all deaths occurring under the services of the RCCH from 1999 to the present. Data includes direct and underlying causes of death gathered from the death notification form by the author. Where necessary this has been adjusted to provide a logical cause of death sequence. Where possible this has been compared with cause of death data from the Child Healthcare Problem Identification Programme (ChIP) that was introduced into parts of the hospital in 2007 and the most accurate cause of death recorded. HIV-related information is known to be lacking in many death notification forms: the ChIP information and the Disalab hospital results system have been used to check for laboratory evidence of HIV infection in patients whose death notification cause did not have any information in this regard. Information on gender, age, and site of death has been recorded.
Results from two 5 year periods (1999-2003 & 2004-2008) were compared where appropriate.

Results:
After peaking at 20.2 deaths per 1000 hospital admissions, the rate dropped to 16.1 in 2008, despite a 10% increase in the number of admissions. Most deaths took place in the ICU (42%) and the medical wards (45%). The number of deaths attributed to HIV/AIDS was 95 (4.2/1000 admissions) in 1999, rose to a maximum of 148 in 2002, and, despite better case ascertainment, dropped to the lowest figure so far (69 deaths, 3.1/1000 admissions) in 2008. Deaths due to diarrhoea showed a similar precipitate drop: 185 in the first 5 years; 78 in the second 5 years.

Conclusions:
This audit has demonstrated an encouraging reduction in death rates from two of the most common infectious diseases despite increasing patient load at the hospital. This probably reflects effective prevention of mother to child transmission, better case management and specific therapy for HIV infection in Cape Town.

References:
1) Grandin W, Westwood A, Lagerdien K, ShungKing M. Deaths at the Red Cross Children's Hospital 1999-2003: a study of death notification forms. S Afr Med J 2006;96:964-968

Title: **UNDERSTANDING ADOLESCENTS' PERSPECTIVES OF INTIMATE RELATIONSHIPS**

Authors: Aník Gevers[a,b], Alan J. Flisher[a,b], Catherine Mathews[c,d]

Department: [a]Division of Child & Adolescent Psychiatry, University of Cape Town
[b]Adolescent Health Research Unit, University of Cape Town
[c]Medical Research Council
[d]School of Public Health & Family Medicine, University of Cape Town

Objective:
Gain an understanding of contemporary adolescents' conceptualisations and constructions of intimate relationships.

Background:
Intimate relationships are developmentally normative during adolescence and play an important role in adolescents' functioning and psychosocial development. It is important to understand how these relationships are created and experienced and the impact they have on adolescents. Such an understanding is particularly important to inform health promotion and ill-health prevention efforts. Unfortunately, little systematic research has established a nuanced understanding or body of knowledge about contemporary adolescents' ideas about and experiences of these relationships.

Method:
Twelve focus group discussions and 25 individual interviews focused on intimate relationships were conducted with a demographically diverse group of Grade 8 and Grade 11 adolescents recruited from Cape Town-area schools. The qualitative data obtained from these discussions and interviews were transcribed (and translated into English where needed) and then coded and analysed in NVivo8 using a framework approach.

Results:
Adolescents' reports provided insight into the language they use to discuss relationships, the types of behaviours they engage in within the relationship context, and how they experience the relationships and their impact on their lives. Peer pressure and the reward of status among peers play a significant role in adolescents' intimate relationships and behaviour within these relationships. Of particular clinical interest are adolescents' ideas about healthy and unhealthy relationships and their, often contrasting, relationship behaviour, help-seeking, and identified struggles or challenges. Sex, violence, multiple partnerships, peer pressure, rumours or gossip, and dishonesty were the main themes of adolescents' reports of intimate relationships and often these issues were identified as being problematic to individuals. Sexual behaviour was identified as a defining characteristic of intimate relationships and descriptions of this behaviour indicated that risky sexual behaviour, alcohol use, and violent behaviour were often intertwined. Multiple partnerships were described as normative behaviour and most participants identified this issue as a cause of violence within relationships.

Conclusions:
Understanding adolescents' perspectives of intimate relationships is important in clinical, particularly psychosocial, work with adolescents. The sexual, substance use, and violent risk behaviour that occurs within adolescent intimate relationships have significant mental and physical health consequences for adolescents. As healthcare professionals we need to understand this important social relationship in order to better guide our adolescent clients in developing relationship skills and dealing with relationship issues, as well as monitoring risk and responding to the various health consequences that adolescents experience as a result of relationship behaviours.

Title: **A NINE MONTH (JAN 2009 – SEP 2009) PROSPECTIVE RE AUDIT OF THE INCIDENCE OF NECROTISING ENTEROCOLITIS (NEC) IN THE GSH NURSERY**

Authors: Y Joolay, A R Horn, N Rhoda, C H Pieper and M C Harrison

Department: Neonatal Medicine, Department of Paediatrics, University of Cape Town

Background:
NEC is an acute bowel disease of unknown origin, associated with prematurity and/or events that cause bowel ischemia, characterised by clinical features and abdominal X- ray abnormalities. Despite advances in the care of premature infants, NEC remains one of the leading causes of morbidity and mortality in this population. We previously audited NEC in our nursery over a year period from July 2007 – June 2008.

Objectives:
The aim of this study was twofold:
1) To determine the numbers and incidence of NEC in inborn infants over a nine month period
2) To compare the numbers and incidence with that of the previous audit

Design/Methods:
A prospective data base was kept of all infants with diagnosed/suspected NEC. Patients referred to GSH with the confirmed diagnosis of NEC were excluded. Notes were obtained on all these infants and the diagnosis was confirmed by a senior clinician after reviewing clinical, radiological and investigative data. Known and suspected risk factors for NEC, treatment and outcome were also documented. Finally, the data were compared to that of the previous year.
The denominator for incidence included all infants in GSH nursery.

Results:
10 infants were identified with NEC, 6 males and 4 females. The mean gestational age was 29.5 weeks, range (26 – 33.3 weeks), and the mean birth weight 1004 grams, range (700 – 1490 grams). 40% were managed conservatively and 60% underwent surgery. The incidence overall in nursery admissions was less than 1%.
This compares with a total of 43 infants identified with NEC in the first nine months of the previous audit and an overall incidence at that time of 2.5%.

Conclusions:
The total number of cases of NEC diagnosed in the GSH nursery over a nine month period in 2009 compared to the previous year has reduced from 43 to 10. The majority still occur in the Very Low Birth Weight, growth restricted infants. Although the data is encouraging, we continue to be vigilant in our approach to reducing NEC within our unit.

Title: **CLEAN INTERMITTENT CATHETERIZATION IN CHILDREN THROUGH A CONTINENT CATHETERIZABLE CHANNEL**

Authors: John Lazarus and Jeanette Raad,

Department: Paediatric Surgery, Red Cross Children's Hospital

Aim:
We evaluated the role of clean intermittent self-catheterisation through a continent catheterisable Mitrofanoff channel in children with bladder dysfunction and outlet obstruction.

Materials and Methods:
We retrospectively analysed the records of 22 patients treated between 1999 and 2009 who underwent surgery to create a continent catheterisable stoma.

Results:
The mean patient age was 7 years (range 3-13) with a male-to-female ratio 1:4. The main congenital and acquired abnormalities were exstrophy plus epispadias in 6, posterior urethral valves in 2 patients, neuropathic bladder in 2, nonneurogenic neurogenic bladder in 1 and following trauma in 2. Augmentation cystoplasty was performed using various bowel segments. The Mitrofanoff channel was made using appendix in all cases. A stoma was created in the right iliac fossa or at the umbilicus. Complications included bladder calculus in 2 patients, UTI were common, stomal stenosis was not seen. Compliance was observed in most patients at a mean followup of 7 years.

Conclusions:
In a developing country setting with a low socioeconomic and educational level it is possible to successfully perform augmentation cystoplasty with clean intermittent self-catheterization through a continent catheterizable channel in children with bladder dysfunction and outlet obstruction. The active role of pediatric urologists, stomatherapist and urodynamicist in the care, teaching and counseling are the reasons for acceptance and compliance.

Title: **BACTERAEMIA IN A COHORT OF HIV-INFECTED CHILDREN IN SOUTH AFRICA.**

Authors: David M le Roux, Mark F Cotton, Stanzi M le Roux, Heather J Zar

Background:

Bacteraemia is an important cause of morbidity and mortality in HIV-infected children. In sub-Saharan Africa, many of these children do not yet have access to highly active anti-retroviral therapy.

Methods:

HIV-infected children enrolled in a randomised controlled trial of isoniazid preventive therapy were followed from December 2002 to December 2007. Blood cultures were taken during acute admissions when clinically indicated.

Results:

One-hundred-and-seventy-three children were followed up for a total of 450 person-years. A total of 302 blood cultures were taken from 97 children. Forty-five bacteraemias occurred in 30 children; 7 children had more than 1 bacteraemia, 3 cultures grew more than 1 pathogen. Of the 48 pathogens, 22 (46%) were Gram negative bacteria, 24 (50%) were Gram positive bacteria and 2 (4.2%) were fungi. One-third of all positive cultures grew *Streptococcus pneumoniae.*

Thirty-six children died during the study (20.8%); children with bacteraemias had higher risk of death (risk ratio for mortality 4.77, 95% CI 2.83 to 8.03, p<0.0001). The overall incidence rate of bacteraemias was 9.9 per 100 person years. There was an increased rate of bacteraemias in the first 3 months after starting HAART compared to children not on HAART (58.3 per 100 person years, incidence rate ratio 5.51 (95% CI 2.59 to 11.38, P<0.0001). However children established on HAART for more than 3 months had a significantly decreased incidence rate (4.4 per 100 person years, incidence rate ratio 0.42, 95% CI 0.17 to 0.92, p=0.0098)

Conclusion:

Bacteraemia in HIV-infected children is common and associated with a high mortality; we observed significantly decreased bacteraemias in children well established on HAART.

Title: **THE INFLUENCE OF MATERNAL HIV INFECTION ON MATERNAL AND INFANT VACCINE-INDUCED ANTIBODY RESPONSES**

Authors: Christine Jones[1,2], Beate Kampmann[1,2], Corena De Beer[3], Monika Esser[3], Anneke Hesseling[3]

Department: [1] University of Cape Town, [2] Imperial College, London, UK, [3] Stellenbosch University

Background:
Reduced trans-placental passage of maternal antibodies may in part explain the excess morbidity and mortality seen in HIV-exposed, uninfected infants.

Objective:
To investigate the influence of maternal HIV infection on vaccine-induced antibody responses at delivery in mothers and infants and on infant antibody responses following routine vaccination.

Methods:
Mother/infant pairs are recruited from a South African urban settlement with a high burden of HIV. Blood samples are collected from mothers and infants at delivery and infants at 16 weeks of age following vaccination at 6, 10 and 14 weeks. Samples are analysed for vaccine-induced antibodies to pertussis and *Haemophilus influenzae* type B (Hib) using standard ELISAs.

Results:
HIV-infected mothers have significantly lower antibody titres at delivery compared to HIV-uninfected mothers to both pertussis (p=0.012) and Hib (p=0.011). HIV–infected mothers were less likely to have antibody titres considered as protective against pertussis (OR 0.08; 95% CI 0.004–1.55; p= 0.05) or Hib (OR=0.15; 0.03 – 0.76; P=0.012). Accordingly, HIV-exposed infants had lower anti-pertussis (p= <0.001) and Hib (p=<0.001) titres at birth compared to HIV-unexposed infants. None of the HIV-exposed infants had titres considered protective against pertussis or Hib whilst 56% (OR=0.03, 95% CI 0.002 – 0.58, p=0.005) and 53% (OR= 0.04 , 95% CI 0.001-0.65, p=0.00) of HIV-unexposed infants had titres considered protective against pertussis or Hib respectively. Conversely, there was a trend towards HIV-exposed infants having higher anti-pertussis and anti-Hib titres at 16 weeks of age post vaccination at 6, 10 and 14 weeks.

Conclusions:
Initial analysis of this mother infant cohort study shows that HIV-infected mothers and HIV-exposed infants have lower vaccine-induced antibody titres at delivery, but these infants may respond better to vaccination than HIV-unexposed infants. Analysis of longitudinal samples is ongoing to assess infant responses following vaccination to a wide range of vaccine-induced antibodies, including pertussis, Hib, tetanus, pneumococcus and Hepatitis B. This mother/infant study has potential to inform vaccine policy for HIV-infected pregnant women and HIV-exposed infants.

Title: **LIPODYSTROPHY IN CHILDREN ON COMBINED ANTIRETROVIRAL THERAPY**

Authors: Thania Hisham[1*], Lil Hobbs[1], Lucia Matshoba[1], Paul Roux[1,2], Diane Gray[1]

Department: [1]Paediatric HIV Service, Groote Schuur Hospital, Cape Town [2]School of Child and Adolescent Health, University of Cape Town, South Africa

Background:
Of the more than 40 million people living with HIV/AIDS worldwide, nearly 30 million individuals are living in sub-Saharan Africa, 2.1 million of which are children. The introduction of highly active antiretroviral therapy (HAART) has dramatically reduced mortality and AIDS related morbidity. Increased long term survival means late HAART related side effects are increasingly seen in our clinics. Changes in body shape, or the lipodystrophy syndrome, are most commonly seen when a HAART regimen includes nucleoside reverse transcriptase inhibitors (NRTIs), especially Stavudine.

Aim:
To investigate the frequency of lipodystrophy syndrome in HIV-infected children receiving HAART.

Method:
This study was a retrospective review of routinely collected clinical data between 1 March 2008 and 30 August 2009. All children on HAART attending two paediatric antiretroviral clinics, one community clinic and one urban hospital clinic. A total number of 697 children were included in the study. Diagnosis of lipodystrophy was based on clinical signs that included loss of subcutaneous fat in the arms, legs, face and buttocks and/or fat gain in the abdomen and trunk, especially a gain in visceral fat. Baseline photographs were taken of all the children on or starting HAART and used as a point of reference to detect lipodystrophy. All children diagnosed with lipodystrophy syndrome had the likely causative medication, Stavudine, switched to either Abacavir or Tenofovir and were followed up with clinically and with repeat photographs six months after switching.

Results:
Six hundred and ninety seven children where included in the study. Twenty two (3.2%) of children developed lipodystrophy during the study period. All the children were on a Stavudine containing regimen together with one other NRTI and either a non nucleoside reverse transcriptase inhibitor or a protease inhibitor. The median time between starting HAART and developing lipodystrophy was 48 months (range 19; 79). Of the 22 children who developed lipodystrophy 50% were female. The mean age of onset of lipodystrophy was 7.7 year (SD 3.3)

Conclusion:
Lipodystrophy is a common long term side effect of antiretroviral therapy. Standardized measures for lipodystrophy are lacking. In our cohort Stavudine was the medication most commonly associated with lipodystrophy. Management of these children includes the use of alternative antiretroviral medication. Long term outcome of patients with lipodystrophy is unknown. Clinicians providing ARVs must be aware of possible long term adverse events of antiretroviral therapy as prompt response and appropriate management may improve outcome.

Title: **MALIGNANCY IN HIV-POSITIVE SOUTH AFRICAN CHILDREN**

Author: A Davidson[1], M Hendricks[1], J Geel[2], L Wainwright[3], D Stones[4]

Department: Haematology / Oncology Services
1. Red Cross Children's Hospital
2. Charlotte Maxeke Johannesburg Academic Hospital
3. Chris Hani Baragwanath Hospital
4. Universitas Hospital

Objective:
To review the epidemiology, management and chemotherapy response of HIV-positive South African children presenting with malignancy .

Methods:
A retrospective analysis was performed by examining the folders of all HIV-positive children diagnosed with malignancy at four centres.

Results:
One hundred and seventy nine HIV-positive children were diagnosed with malignancy between 1990 and 2008. Age at diagnosis ranged from 17 days to 16.85 years. Of the 131 with HIV-associated malignancy, 70 (53.4%) presented with B-cell lymphoma (39 Burkitt lymphomas and 29 other B-cell lymphomas including two primary CNS lymphomas), 49 (37.4%) with Kaposi sarcoma, nine with Hodgkin's Lymphoma and three with Leiomyosarcoma. Forty-eight patients presented with incidental malignancies. Average annual incidence increased from eight per year prior to 2003 to 23 per year in the subsequent five years. Highest annual incidence was 30 in 2005.

Most patients (82.7%) were naïve to antiretroviral therapy (ART) at diagnosis. Many (41.9%) did not receive ART which only became available in 2003. One hundred and twenty cases were treated with chemotherapy and 59 were palliated due to advanced malignancy and /or advanced HIV disease.

Overall survival for the whole group was 30.5%. Considering only those treated with intention to cure it was 39.2%; 57.1% for Hodgkin's disease, 54.6% for Kaposi sarcoma, 50.4% for non-Burkitt B-cell lymphoma, 45.8% for Burkitt Lymphoma and 23.3% for incidental malignancies. With the introduction of ART overall survival increased to 67.4% for Kaposi sarcoma and 69.6% for incidental malignancies, but remained unchanged for non-Burkitt B-cell lymphoma (52.5%) and Burkitt Lymphoma (45.2%). Overall survival for the 24 patients already on ART at diagnosis who received chemotherapy was 74.3%.

Conclusions:
This study shows less primary CNS lymphoma and more Kaposi sarcoma than reported in the developed world, but confirms a high incidence of non-Burkitt B-cell lymphoma in these patients. The high number of incidental malignancies underscores the prevalence of HIV-AIDS in South Africa. Treatment results are disappointing but should improve as the number of patients who are ART-naïve declines.

Title: **PNEUMOCYSTIS PNEUMONIA IN SOUTH AFRICAN HIV- INFECTED AND UNINFECTED INFANTS IN THE ERA OF HIGHLY ACTIVE ANTI-RETROVIRAL THERAPY.**

Authors: Brenda Morrow [1,2], Nei-Yuan Hsaio[3], Marco Zampoli[1,4], Andrew Whitelaw[5], Heather J Zar[1,4].

Department:

1. School of Child and Adolescent Health, University of Cape Town (UCT)
2. Medical Research Council of Southern Africa
3. Division of Clinical Virology, National Health Laboratory Services and UCT
4. Division of Paediatric Pulmonology, Red Cross Children's
5. Division Of Clinical Microbiology, National Health Laboratory Services and UCT

Background:
Pneumocystis pneumonia (PCP) is a major cause of hospitalisation and mortality in HIV-infected African children.

Aim:
The aim of this study was to investigate the incidence and outcome of PCP in South African children living in a high HIV-prevalence area in the context of a free, available anti- retroviral therapy program.

Methods:
Sequential children hospitalised with hypoxic pneumonia were prospectively enrolled from November 2006 to August 2008. Socio-demographic, historical, clinical and outcome data were collected. A nasopharyngeal aspirate and lower respiratory tract sample (induced sputum or bronchoalveolar lavage) were submitted for PCP immunofluorescence. Lower respiratory tract samples were also investigated for bacterial, mycobacterial and viral pathogens.

Results:
202 children were enrolled; 124 (61.4%) were HIV- infected; 34 (16.8%) were HIV exposed but uninfected and 44 (21.8%) were HIV unexposed. Amongst HIV- exposed children, 70 (44.3%) had participated in the Prevention of Mother to Child Transmission (PMTCT) program; however, only 18.4% were taking trimethoprim-sulphamethoxazole (TMP-SMX) prophylaxis. PCP occurred in 43 children (21.3%) of whom 33 (76.7%) were HIV- infected. The mortality rate of children with PCP was higher than those without PCP (39.5% compared to 21.4%; relative risk 1.85; 95% confidence interval 1.15 – 2.97*; p* = 0.01).

Conclusion:
PCP remains a common cause of hypoxic pneumonia and mortality in HIV- infected South African infants. Under-use of the PMTCT programme and failure to institute TMP-SMX prophylaxis in HIV- exposed children identified through

Title: **LOW RATES OF HEPATOTOXICITY IN HIV-INFECTED CHILDREN ON ANTIRETROVIRAL THERAPY WITH AND WITHOUT ISONIAZID PROPHYLAXIS**

Authors: D Gray[1,2*], J Nuttall[2], M Davies[2,3], C Lombard[4], L Workman[2], P Apollis[2], BS Eley[2], MF Cotton[5], HJ Zar[2]

Department: [1]Paediatric HIV Service, Groote Schuur Hospital, Cape Town, South Africa [2] School of Child and Adolescent Health, Red Cross Memorial Children's Hospital, University of Cape Town, South Africa [3] School of Public Health and Family Medicine, University of Cape Town, South Africa [4] Biostatistics Unit, Medical Research Council, South Africa [5] KIDCRU, Tygerberg Children's Hospital, Cape Town, South Africa

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Background:
Increasing numbers of HIV-infected children are receiving antiretroviral therapy as access to these drugs improves. Concomitant use of isoniazid preventive therapy or tuberculosis therapy is common. However, there is little information on the hepatotoxicity of such therapy in children.

Objectives:
To investigate the incidence of hepatotoxicity in HIV-infected children during antiretroviral therapy and the impact of concomitant use of isoniazid preventive therapy.

Method:
Retrospective cohort analysis of HIV-infected children who commenced antiretroviral therapy or were followed up between September 1998 and November 2005. Changes in alanine transferase levels (ALT) were at baseline, at 1, 3 and 6 months and then 6 monthly thereafter for up to 2 years. ALT levels were graded according to the standardised Paediatric AIDS Clinical Trials Group grading system (grade 1-4), from least to most severe. Clinical information was obtained from review of case records.

Results:
Of the 598 children included, 425 were taking antiretroviral therapy alone, 73 antiretroviral therapy and isoniazid, 39 isoniazid alone and 61 neither isoniazid nor antiretroviral therapy. At baseline, almost a third of children (32.7%) had raised ALT levels most of which (98%) were mild. There was no increased risk of hepatotoxicity with antiretroviral therapy with or without isoniazid compared to the control group over a 2 year period. Grade 3 or 4 ALT elevations occurred in 19 (3.4%) children, with no cases of fulminant hepatic failure.

Conclusion:
Severe hepatic events are uncommon in children on antiretroviral therapy or isoniazid. There is no increased risk of hepatotoxicity with antiretroviral therapy and concurrent isoniazid preventive therapy.

Title: **TUBERCULOUS TUBULO-INTERSTITIAL NEPHRITIS PRESENTING WITH SEVERE PROTEINURIA IN HIV INFECTED CHILDREN IN CAPE**

Authors: Nourse P, Cotton MF, Bates W

Introduction:
In Cape Town many children are co-infected with HIV and tuberculosis. Tuberculous tubulo-interstistitial nephritis is a recognized entity described in immune competent and renal transplant patients. It has not yet been described in HIV-infected patients. Our objective was to establish if tuberculous interstitial nephritis played a role in renal disease in HIV-infected children. **Method:** We identified children co-infected with Tuberculosis and HIV from our database and reviewed their biopsies and clinical notes.

Results:
Since 2002, 12 renal biopsies or postmortem examinations were done in HIV infected children at our institution. In four cases, median age 73(24 to 108) months, the clinical scenario and renal biopsies were consistent with tuberculous interstitial nephritis. All four patients had WHO stage IV disease. Mean CD4 count and percentage: 508 cells/µl (23%) All four cases presented with culture proven disseminated tuberculosis (not yet on treatment). All four had nephrotic range proteinuria and hypoalbuminuria. Renal biopsies: Prominent features were a severe interstitial inflammatory infiltrate and mild to moderate mesangial proliferation. An interstital granuloma was seen in one patient. In two patients proteinuria completely resolved after antituberculosis treatment alone (without HAART). The other two patients were already on HAART prior to their renal illness. In both cases proteinuria resolved after TB treatment.

Conclusion:
Tuberculous tubulo-interstistitial nephritis contributes to proteinuric renal disease in HIV-infected children and improves on antituberculosis treatment.

Title: **IMPROVED GIT TOLERANCE OF ENTERIC-COATED MYCOPHENOLATE SODIUM IN PAEDIATRIC RENAL TRANSPLANT PATIENTS: A RETROSPECTIVE REVIEW.**

Authors: Savage L,Wiggelinkhuizen J, Maytham D, Van Dugteren G, Sinclair P, Morrison C, Abdo T, Nourse P, McCulloch M, Gajjar P.

Department: Renal Unit, Red Cross Childrens' Hospital, Cape Town

The efficacy of Mycophenolate Mofetil (MMF) in preserving graft function is well-known, but its gastrointestinal side-effects may limit its use. Conversion to enteric-coated Mycophenolate sodium (EC-MPS) may reduce the gastrointestinal complications.

Objective:
1) To assess improvement in GIT symptoms in renal transplant patients after conversion from MMF to EC-MPS.
2) To assess stability of graft function post-conversion.

Method:
A retrospective folder review of all paediatric renal transplant patients converted to EC-MPS was undertaken, with specific attention to GI symptoms 12 months pre- and 12 months post-conversion to EC-MPS, serum creatinine, concomitant medication and infections.

Results:
Data was collected from 10 patients, age 8 – 19 years (average 14.1 years). One patient was converted to EC-MPS without receiving MMF. Of the remaining 9 patients, 6 had received MMF for an average of 2.65 years prior to conversion and 3 patients has received MMF for less than 2 months. At conversion, all 9 patients had diarrhoea and abdominal pain; 6 also had vomiting and 3 had significant weight loss. Two patients needed admission for intravenous rehydration and treatment of concomitant rejection. All 6 patients on long-term MMF had GI symptoms on at least one occasion in the preceding 12 months.

Six patients (60%) had no further GI complaints in the 12 months following conversion. The other 4 patients continued to complain of intermittent, milder GI symptoms. Two of them had concomitant CMV viraemia, possibly aggravating GI symptoms.

Three patients had acute rejection at the time of conversion, and 3 others had chronic allograft nephropathy.Four patients maintained stable renal function for 9 months post-conversion.

Conclusion:
MMF causes significant GI side-effects in our paediatric population, with >50% of children on MMF needing conversion to EC-MPS. 60% of children had complete resolution of GI symptoms on EC-MPS. Graft stability was difficult to assess because patients are only converted to MMF when they have a rising creatinine, but EC-MPS did not adversely affect renal function.

Title: **ESTABLISHING THE REPRODUCIBILTY OF THE PAEDIATRIC RADIONUCLIDE RENOGRAM**

Authors: Anita Brink, Michael D Mann

Objective:
The aim of the study was to evaluate reproducibility of MAG3 renograms. MAG 3 renograms are frequently used to determine the differential renal function (DRF) of children's kidneys. DRF is used in clinical practice to guide patient management.

Method:
176 renograms in the department's archive were selected to ensure this study included patients with a range of DRF from two equally functioning kidneys to solitary kidneys and with normal and impaired renal function.

The raw data was retrieved from the archive and each renogram was processed 5 times using three different algorithms for calculating DRF, two for the integral method and one for the Rutland Patlak plot.

The influences of the following factors on the reproducibility were assessed:

1. Method used to process the renogram
2. Glomerular filtration rate (GFR)
3. Age of the patient
4. The differential renal function
5. The asymmetry in renal function

Results:
The mean differential renal function for the Phillips Integral method (PI), Samal Intgral method (SI) and the Samal Rutland Patlak Plot method (SRP) were 55.2, 52.4 and 52.6
respectively. ($p<0.001$) We used standard deviation (SD) of the 5 estimates of DRF for each method for each patient as an index of variability. The SDs were small for the majority of cases but there were significant differences between the methods. The SDs were largest in children under 6 months and children with low GFR's.

Conclusions:
The paediatric radionuclide renogram gives very reproducible results across a wide spectrum of renal function, patient age and asymmetry of renal function. The reproducibility is not quite as good in babies

Title: **THE INCIDENCE OF TUBERCULOSIS IN PATIENTS REFERRED FOR LIVER TRANSPLANT ASSESSMENT AT RED CROSS WAR MEMORIAL CHILDREN'S HOSPITAL:**

Authors: De lacy R; Goddard E; Spearman CWN; Millar A

Aim:

To determine the incidence of tuberculosis (TB) in patients referred for liver transplant assessment over a 5 year period.

Method:

A retrospective review of referral forms and folders of patients referred to the Liver Transplant Clinic at Red Cross War Memorial Children's Hospital (RXH) from June 2004 to June 2009

Results:

During this period 154 patients were referred for liver transplant assessment, of which 75 were seen at RXH. There were 42 female and 33 male patients. All the patients are screened for tuberculosis and 13 patients were diagnosed with TB, 11 female and 2 male. Ten patients were started on first line TB treatment – Rimcure and 3 patients were started on second line TB treatment.
Outcome- 5 patients died from chronic liver disease , not secondary to TB. 3 had liver transplants , 1 patient was not accepted onto the list and the rest are on the inactive transplant list

Conclusion:

Although a small group of patients, the incidence of tuberculosis was 17.3% and the majority of patients tolerated first line TB treatment. None of the patients died secondary to TB but the fact that they were started on TB treatment does take them off the active transplant list for 6 months in patients who need a transplant urgently. These patients need frequent screening for TB as they may not present with the common symptoms of TB.

Title: **HEPATOPULMONARY SYNDROME IN CHILDREN UNDERGOING LIVER TRANSPLANTATION**

Authors: EA GODDARD, CWN SPEARMAN, De LACY R, MI McCULLOCH, A BRINK, A NUMANOGLU, AJW MILLAR, D KAHN.

Department: Red Cross Children's Hospital, School of Adolescent and Child Health, University of Cape Town, Cape Town, South Africa.

Background:
Hepatopulmonary syndrome (HPS) occurs in 15-20% of patients with cirrhosis. Liver transplantation is the only effective treatment for HPS.

Aim:
To analyse the outcome of children with HPS who underwent liver transplantation.

Method:
This was a retrospective study over the past 8 years (April 2000 to April2008). HPS was diagnosed using a technetium 99m-labeled macroaggregated albumin scan (MAA scan).

Results:
During this period HPS was diagnosed by MAA scan in 3 patients who underwent liver transplantation. A total of 47 transplants were done in the unit over this time. The size of the shunts were 36%, 40% and 32% (normal <8% in systemic circulation). The perioperative and postoperative outcome was uneventful in 2 patients. The 3rd patient developed on ileal perforation on day 10. The patients received mechanical ventilation for a mean of 6 days (range 2 to 12 days). Two patients received nitric oxide therapy whilst on ventilation. All 3 patients had repeated venesections in the first 3 post-op weeks to prevent the haematocrit from rising above 40%. None of the patients received heparin prophylaxis. The 3 patients required prolonged (5, 7 and 10 months) home oxygen therapy. These patients are well and are leading productive lives 36, 53 and 72 months post transplantation

Conclusion:
HPS was reversible after OLT in all our patients. All patients with HPS who underwent Liver transplantation are alive and well.

Title: **CHARACTERISTICS OF TUBEROUS SCLEROSIS COMPLEX IN A SOUTH AFRICAN COHORT: DESCRIPTION AND PARENTAL UNDERSTANDING.**

Authors: Pauline Samia, B Schlegel, J Wilmshurst

Introduction:
Tuberous sclerosis complex (TSC) is a genetically inherited condition that manifests with benign non-invasive tumours or hamartomas in multiple organ systems. The condition is of autosomal dominant inheritance with an estimated incidence of 1 in 6000 live births. Population based studies estimate the prevalence of TSC to be 1 per 14, 492 population.
TSC has myriad presentations but 80 to 90% of these children have seizure disorders. The prevalence of learning disabilities in children with TSC ranges from 38% to 80%. Pervasive developmental disorders (PDD) and attention deficit hyperactivity disorder have been identified in half of the children with TSC. Cutaneous manifestations occur in more than 90% of TSC patients. Cortical tubers, cardiac rhabdomyomas and renal angiomyolipomas are other lesions associated with TSC in children.
Currently TSC has no cure and associated complications manifest with advancing age. Parents are faced with the challenge of life long care for these children. Half of the parents of children with TSC suffer significant psychological stress. Child specific factors, health literacy, and social stability are some factors known to impact on parental understanding of a child's chronic illness. Data specific to parental understanding of TSC are limited.

Methodology:
A retrospective case note review was performed to obtain the patient demographic and clinical presentation data. A prospective observational study provided the parental background characteristics and information on their understanding of TSC.

Results:
A total of 31 patient case notes were included in the review. The median patient age at the time of data was 132 months (IQR 96.00). The male: female ratio was 4:1.
Seizures were observed in 27 patients (87.1%). Infantile spasms were reported in 3 (9.6%) patients while partial seizures occurred in 11 (35.5%) patients. More than one anticonvulsant was required in 15 (48.4%) of the 27 patients with seizures.
Fourteen (53.8%) had global developmental delay. Two children (6.4%) were both hyperactive and aggressive and six (19.3%) were considered hyperactive. Aggressive behaviour was observed in four (12.9%) other children.
Parents of 21 patients gave consent to participate in the study. The median parental age was 38 years (IQR 10.5). Seven parents (33.3%) had attained a primary level of education. Secondary education was attained by ten parents (47.6%) and three (14.3%) had received tertiary education.
A statistically significant difference, p value =0.001, was observed in the change in the level of knowledge on comparison between the parent group that received a leaflet and the one that did not. A parental level of education of grade 8 was associated with a significantly higher baseline knowledge score (p value = 0.045) and a significantly greater change in the level of knowledge score (p value = 0.003).
No association was detected between a parent's duration of clinic attendance and the baseline level of knowledge (p value = 0.63) There was no association between a parents baseline level of knowledge and their assessment of the impact of TSC on their child. (p value = 0.61)

Conclusions and recommendations:
The clinical profile of the cohort of children seen at the Red Cross Children's Hospital is similar to that of other cohorts described in literature. Parental understanding of TSC can be improved by provision of written information for those with at least a grade eight level of education. The information leaflet used in this study can be used to educate parents of children with TSC.

Title: **REVIEW OF PAEDIATRIC ELECTROENCEPHALOGRAM PRACTICE AT THE RED CROSS CHILDREN'S HOSPITAL WESTERN CAPE**

Authors: V Kander

Department: Electrophysiology Department Red Cross Children's Hospital
Cape Town South Africa

Aim:

To ascertain the source, consistency of reporting, appropriateness of referrals, and the use of EEG studies to confirm diagnosis of syndromes and classification of types of epilepsy in patients referred to our service.

Method:

We performed a retrospective audit of referral patterns to the neurophysiology department over a 3 month period. We analysed the demographic pattern, reason for referrals, internal reporting and the pattern of diagnosis in this audit.

Results:

Of the 281 selected referrals (0-16 years; 155 males:126 females), 174 patients had awake EEG studies, 100 had sedated/natural sleep and 7 patients had decreased level of consciousness. Full head montages were performed on 202 patients and 79 patients had neonatal montages. Neurologists requested 23.4% of the EEG studies, and paediatricians 44.9%. Most patients came from the metropole (86.8%). A third of studies had no request forms, mostly from neurologists. The usefulness of the EEG studies was evident in 38.1% of cases. Routine EEG studies with normal results for non-epilepsy reasons were highly predictable in 18.1%. Neurologists appeared better than paediatricians and non-specialists in terms of appropriateness of referrals.

Conclusion:

Guidelines would assist in the requesting practice, and would improve the usefulness of the procedure in supporting diagnosis and management.

Title: **ENDOSCOPIC THIRD VENTRICULOSTOMY FOR HYDROCEPHALUS COMPLICATING BRAIN INFECTIONS IN CHILDREN**

Authors: Padayachy L, Fieggen AG, Figaji AA.

Department: Red Cross Children's Hospital
University of Cape Town

The role of endoscopic third ventriculostomy (ETV) for hydrocephalus of infectious etiology is at present unclear. By far, the largest experience with post-infectious hydrocephalus is from a Ugandan series. The authors reported very favourable results, and that young age did not diminish the success of the procedure. However, this is not necessarily the experience in other centres, including our own anecdotal experience. There are several potential reasons for this difference. Unfortunately, very little has been published from other centres. Furthermore, it is unclear whether it makes a difference if ETV is performed in the acute phase or in the post-infectious phase of the illness.

In this retrospective study of prospectively collected data, we examined 42 children who had brain infections leading to hydrocephalus that was treated with ETV. Data collected included the indication for surgery, clinical features, the diagnosis of infection as the underlying aetiology, computed tomography features, endoscopic findings, and subsequent clinical and radiological course. We will present our findings with regard to success rate, and the analysis of the relationship between pre-operative factors and the likelihood of ETV success.

Results:
A total of 41 patients were treated from 2000 to 2008, using ETV to treat hydrocephalus secondary to brain infection, either due to TBM or bacterial meningitis.The results were correlated with various factors, and ultimately showed that ETV was possible in 80% of the cases, with a success rate of 45% (with intention to treat), Higher success rates were seen in children who were older than 1yo, has atricentricular pattern of hydrocephalus and were treated in the post infectious phase of the disease.

Conclusion:
In selected patients, ETV may be an option to treat hydrocephalus, of infectious origin. The benefit of rendering these patients free of a VPS,still makes an attractive option.

Title: **ADHERENCE TO ISONIAZID PROPHYLAXIS AMONG HIV-INFECTED CHILDREN: A RANDOMISED CONTROLLED TRIAL COMPARING TWO DOSING SCHEDULES**

Authors: Stanzi M le Roux[1*], Mark F Cotton[2], Jonathan E Golub[3], David M le Roux[1], Lesley Workman[1] and Heather J Zar[1]

Department: [1] School of Child and Adolescent Health, University of Cape Town, South Africa; [2] Department of Paediatrics and Child Health, Stellenbosch, South Africa; [3] Department of Epidemiology, Johns Hopkins School of Medicine & Bloomberg School of Public Health, USA

Background:
Context – Tuberculosis contributes significantly to morbidity and mortality among HIV-infected children in sub-Saharan Africa. To benefit from tuberculosis prophylaxis, medication adherence and cost-effectiveness must be optimised.
Purpose –To investigate whether HIV-infected children achieve superior adherence to isoniazid prophylaxis administered daily as compared to three times per week and to assess predictors of adherence.

Methods:
Design – Two center randomized trial comparing daily to three times per week dosing of isoniazid.
Setting – Two tertiary pediatric care centers in Cape Town, South Africa.
Patients - 324 HIV-infected children aged ≥ 8 weeks, followed over 5 years. Adherence information based on pill counts was available for 276.
Outcome – Percentage adherence was calculated using counts of pill returns. Adherence ≥ 90% was considered optimal. Analysis was done on summary and repeated measures, comparing adherence between the two dosing schedules. Mean percentage adherence (per child during follow-up time) was used to compare group means as well as the proportion of children achieving adherence ≥ 90% in each group. For repeated measures, percentage adherence (per child per visit) was dichotomized at 90%. A logistic regression model with generalized estimating equations (GEE) to account for within-individual correlation was used to evaluate the impact of dosing schedule after adjusting for potential confounders and to assess potential baseline and time-varying adherence determinants.

Results:
Overall adherence to isoniazid was excellent, with mean adherence 94.7% (95% CI 93.5-95.9%); similar mean adherence was achieved in the daily (93.8%, 95% CI 92.1-95.6%) and in the three times a week group (95.5%, 95% CI 93.8-97.2%). Two-hundred-and-seventeen (78.6%) of children achieved a mean adherence of ≥90%. Adherence was similar comparing daily and three times a week dosing schedules in univariate (OR 0.88, 95% CI 0.66-1.17, p=0.38) and multivariate (AOR 0.85, 95% CI 0.64-1.11, p=0.23) models. Children from overcrowded homes were less adherent (AOR 0.71, 95% CI 0.54-0.95, p=0.02). Age at study visit was predictive of adherence, with better adherence achieved in children older than 4 years (AOR 1.96, 95% CI 1.16-3.32, p=0.01).

Conclusions:
Adherence to isoniazid was excellent regardless of dosing schedule. Intermittent dosing of isoniazid prophylaxis is likely to be more cost-effective than daily dosing, without compromising adherence or efficacy.

Trial registration - Clinical Trials NCT00330304

Title: **THE EFFECT OF LOW BIRTH WEIGHT AND PREMATURITY ON THE HUMAN IMMUNE RESPONSE TO BCG VACCINATION**

Authors: Frederick Dube**,** Cheryl Day, Sebastian Gelderbloem, Jane Hughes, Gregory Hussey, Willem Hanekom

Department: South African Tuberculosis Vaccine Initiative, Institute of Infectious Diseases and Molecular Medicine and School of Child and Adolescent Health, Faculty of Health Sciences, University of Cape Town, Cape Town, South Africa

Background:
In developing countries, >15% of infants are born preterm (<37 weeks gestation), or have low birth weights (<2,500g). We do not know if the current TB vaccine, BCG, protects these small infants against tuberculosis.

Objective and Hypothesis:
Our aim was to determine if the magnitude and quality of the BCG-induced immune response is affected by birth weight (BW) and by gestational age (GA). We hypothesised that vaccination of preterm and low BW infants results in a suboptimal immune response, compared with vaccination of term or normal BW infants.

Methods:
Infants who received routine BCG vaccination at birth were stratified for BW and for GA. At 10 weeks of age, whole blood was collected and incubated with viable BCG. Brefeldin-A was added at 7 hours, and at 12 hour red cells were lysed, and white cells were fixed and cryopreserved. Later, cells were thawed, permeabilised and stained for CD3, CD4, CD8, IFN-g, TNF-a, IL-2, and IL-17; expression of these markers was measured by multi-parameter flow cytometry.

Results:
Infants with low BW (n=52) had a lower proportion of BCG-specific CD4 T cells co-expressing IFN-γ, TNF-α and IL-2 together, compared with infants with normal BW (n=53; 16.9±1.1% vs. 21.3±11.2%, respectively, p=0.01), and a higher proportion of CD4 T cells expressing IFN-γ only (33.3±1.9% vs. 27.6±1.5%, p=0.02). No other differences in cytokine expression were shown, according to BW and GA.

Conclusion:
Low BW infants appeared to have a lesser ability to produce CD4 T cells co-expressing IFN-γ, TNF-α and IL-2, so-called polyfunctional T cells. Presence of these cells, following vaccination, has been associated with improved outcome following experimental intracellular infection. However, most cytokine expression patterns of specific cells were not affected by BW or by GA. Our study has important implications for neonatal vaccination practices worldwide.

Title: **OPTIMUM MEASUREMENT OF THE IMMUNE RESPONSES INDUCED BY MYCOBACTERIAL ANTIGENS**

Authors: William Kwong Chung[a], David Miles[a], Andreia Soares[a], Anita Schwegmann[b], Willem Hanekom[a]

Department: [a]South African Tuberculosis Vaccine Initiative (SATVI), Institute of Infectious Diseases and Molecular Medicine and School of Child and Adolescent Health, University of Cape Town, South Africa [b]Division of Immunology, Institute for Infectious Diseases and Molecular Medicine (IIDMM), Health Science Faculty, University of Cape Town, and International Centre for Genetic Engineering and Biotechnology (ICGEB), Cape Town, South Africa

Objective:

To establish the optimum time point at which to assess the production of cytokine transcripts induced by mycobacterial antigens in short term assays.

Methods:

Blood was collected from 9 healthy latently infected individuals and stimulated with BCG, ESAT6/CFP-10 and PHA (positive control) for 4, 8, 12 and 24 hours (h). Unstimulated blood was used a negative control. At 4, 8, 12 and 24 h, mRNA was isolated and converted to cDNA. The amount of IL-2, IL-10, IL-17, IFN-γ, TNF-α and GM-CSF transcripts produced at different time points was assessed via real time PCR. This was done in duplicate. All expression results were normalised against those of the housekeeping gene HPRT.

Results:

In the BCG stimulated samples, the transcripts coding for GM-CSF, IL-2 and TNF-α peaked at 4 h, in contrast to IL-17 and IL-10 transcripts which peaked at 8 h. A plateau was reached between 4 and 8 h for IFN-γ transcripts.
In samples stimulated with ESAT6/CFP10, the highest amount of GM-CSF and IL-2 transcripts was produced at 8 h, whereas IFN-γ and TNF-α transcripts were highest at 4 h. However, IL-17 and IL-10 expression was below the detection limit and could not be quantified accurately.

Conclusion:

Given that different cytokines peak between 4 and 8 hours, we concluded that 6 hours was the optimum duration for incubating blood to assess the immune responses at a molecular level.

Title: **MYCOBACTERIA-SPECIFIC CD4 AND CD8 T CELL RESPONSES IN CHILDREN**

Authors: N.G. Tena-Coki[1,2,3,5] , T.J Scriba[1,2,3], N.Peteni[1], Brian Eley[1,3], R.J. Wilkinson[1,5], P.Andersen[4], W. Hanekom[1,2,3] , B. Kampmann[1,4]

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4. Staten Serum Institute (SSI), Denmark.
5. Division of Medicine, Imperial College London, UK.

Objective:
Despite routine vaccination of infants with Bacille Calmette-Guérin (BCG), the only tuberculosis (TB) vaccine available, increasing numbers of children are diagnosed with TB. Moreover, mortality is high in children with concomitant Human Immunodeficiency Virus (HIV) infection. The need for the development of more efficacious vaccines suitable for persons with immunodeficiencies is urgent. We aimed to study the T cell response thought to be relevant in protection against TB.

Methods:
We developed a multi-parameter flow cytometry panel that can be used to phenotypically and functionally characterise the CD4 and CD8 T cell responses to mycobacteria-specific antigens. Whole blood was stimulated with a panel of mycobacterial antigens, including Antigen 85B and TB10.4, which are candidate TB vaccine antigens. CD4 and CD8 T cell cytokine production as well as T cell memory phenotypes were analysed in 3 cohorts: children on TB treatment (n=30), healthy children (n=30) and HIV-infected children prior to starting ART (n=30).

Results:
Specific CD4 and CD8 T cell responses were observed in all groups of children. Frequencies of these specific cells were observed in a remarkably broad range. CD4 T cell responses (IFN-γ^+/IL2$^+$) dominated in TB patients and were mainly of an effector phenotype (CD45RA$^-$CCR7$^-$CD27$^{+/-}$). Single IFN-γ^+ producing CD8 T cell responses dominated in all groups of children. Their main phenotype was CD45RA$^-$CCR7$^-$CD27$^-$ or an effector memory phenotype re-expressing CD45RA (CD45RA$^+$/CCR7$^-$/CD27$^-$).

Conclusions:
Vaccination with subunit vaccines may boost these T cell responses, which may enhance protection against TB in all groups of children.

Title: **LONGITUDINAL CHARACTERISATION OF BCG-SPECIFIC CYTOTOXIC T CELLS IN INFANTS OVER THE FIRST YEAR OF LIFE.**

Authors: Andreia Soares[1], Thomas Scriba[1], Marwou de Kock[1], Charlene Barnard[1], Terry Choice[1], Gregory Hussey[1], Henry Boom[2], Gilla Kaplan[3], Willem Hanekom[1].

Department: [1]South African TB Vaccine Initiative, Institute of Infectious Diseases and Molecular Medicine and School of Child and Adolescent Health, University of Cape Town, Cape Town, South Africa; [2]Tuberculosis Research Unit, Case Western Reserve University, Cleveland, OH, USA; [3]Laboratory of Mycobacterial Immunity and Pathogenesis, Public Health Research Institute, Newark, NJ, USA.

Background:
T cells confer protection against intracellular bacteria through the expression of Th1 cytokines and cytotoxic molecules, such as granulysin. BCG-specific T cell expression of cytotoxic molecules may be a key component in protective immunity against tuberculosis.

Objective:
To determine the functional profiles and longitudinal kinetics of BCG-specific cytotoxic T cells in infants over the first year of life.

Methods:

Blood was collected from 66 HIV-negative infants, who were randomized to 3 or 4 visits at the following 7 ages; 3, 6, 10, 14, 27, 40 and 52 weeks of age. Whole blood was incubated for 3 days with BCG, and T cell cytotoxic and phenotypic profiles delineated by multiparameter flow cytometry.

Results:
Both CD4 and CD8 T cells expressed the cytotoxic molecules, granzyme B, granulysin and/or perforin, upon BCG stimulation. T cells co-expressed cytotoxic molecules in multiple combinations and longitudinal analysis revealed that the magnitude of the response remained consistent throughout the first year of life. In addition, a progressive increase in the frequency of polyfunctional CD8 T cells, co-expressing granzyme B, granulysin and perforin, was observed from 3 to 52 weeks of age. The proportions of specific CD8 T cells expressing intermediate (CD27+CD28-) or mature phenotypes (CD27-CD28-) also increased with age. By contrast, CD4 T cells maintained an early differentiation phenotype (CD27+CD28+) throughout the first year of life.

Conclusions:
BCG-vaccination of infants induces stable populations of CD4 and CD8 T cells with complex cytotoxic molecule expression patterns and distinct differentiation phenotypes.
This study is supported by the TBRU.

Title: **ENHANCED T CELL RESPONSE TO NOVEL M.TB LATENCY-ASSOCIATED ANTIGENS Rv2660 AND Rv2659 IN LATENT INFECTION COMPARED TO TB DISEASE**

Authors: Lerisa Govender[1], Brian Abel[1], Jane Hughes[1], Thomas. J Scriba[1], Benjamin M. N. Kagina[1], Marwou de Kock[1], Terry Choice[1], Gerhard Walzl[2], Gillian Black[2], Peter Andersen[3], Gregory D Hussey[1], Willem Hanekom[1]

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Background:
An estimated one-third of the world's population are latently infected with M.tb and are at risk of developing TB disease during their lifetime. Currently, only prophylactic vaccines for pre-infection administration are being tested in clinical trials, but this approach is unlikely to target the enormous reservoir of latently infected individuals. A post-exposure vaccine that prevents reactivation of TB might have a dramatic impact on global TB burden, but the development thereof requires insight into host immune responses to mycobacterial latency associated antigens. Hence, the aim of this study is to assess immune recognition of Mtb-derived latency-associated antigens, and characterize CD4 and CD8 T cell responses in peripheral blood from latently infected (LTBI) and TB-diseased adults.

Methods:
Blood was collected and PBMCs isolated and cryopreserved from 25 LTBI and 25 TB diseased adults. A 6-day lymphoproliferation assay was performed as follows: PBMCs were stained with Oregon Green, a fluorescent cell tracker, and incubated with medium alone, or with BCG, ESAT-6/CFP-10, Rv2660 and Rv2659 for six days. An IFN-γ ELISA was performed on supernatants harvested, and PBMCs were analysed for antigen-specific CD4 and CD8 T cell proliferation and intracellular cytokine expression of IFN-γ, IL2, and TNF-α by multiparameter flow cytometry.

Results:
Immune recognition of Rv2660 and Rv2659 was observed in LTBI individuals, and this was increased in comparison to the proportion of responders in TB diseased patients. Interestingly, TB disease resulted in decreased viability of T cells, and reduced antigen-specific $CD4^+$ T cell proliferation and cytokine expression capacity to Rv2660, R2659, BCG and ESAT-6/CFP-10. Surprisingly, no difference was observed for the proliferation and associated cytokine expression of Rv2660- and Rv2659-specific $CD8^+$ T cells between the 2 groups.

Conclusion:
Our study is the first to show immune recognition of Rv2659 and Rv2660 in a clinical setting. These latency-associated antigens have potential to be included in post-exposure vaccines to prevent reactivation of TB, or in a multi-stage vaccine strategy combined with prophylactic vaccines for maximum impact on all stages of TB infection.

Title: **THE NOVEL TB VACCINE, MVA85A, INDUCES COMPLEX SUBSETS OF POLYFUNCTIONAL CD4 T CELLS IN CHILDREN**

Authors: Thomas J. Scriba[1], Michele Tameris[1], Nazma Mansoor[1], Erica Smit[1], Linda van der Merwe[1], Fatima Isaacs[1], Alana Keyser[1], Sizulu Moyo[1], Nathaniel Brittain[2], Alison Lawrie[2], Sebastian Gelderbloem[3], Ashley Veldsman[1], Mark Hatherill[1], Anthony Hawkridge[3], Adrian V.S. Hill[2], Gregory D. Hussey[1], Hassan Mahomed[1], Helen McShane[2] and Willem A. Hanekom[1]

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[2]Centre for Clinical Vaccinology and Tropical Medicine & The Jenner Institute Laboratories, Nuffield Department of Medicine, Oxford University, Oxford, UK
[3]Aeras Global Tuberculosis Vaccine Foundation, Rondebosch

Objective:
World-wide, most infants receive BCG to prevent tuberculosis (TB), but BCG-mediated protection against lung TB is highly variable. MVA85A, a new TB vaccine aimed at boosting BCG-primed immune responses, may enhance immunity to TB. We investigated the safety and immunogenicity of MVA85A in healthy children from a TB endemic region, who received BCG at birth.

Methods:
Twenty-four children, aged 1-8 years, were vaccinated with 5 X 10^7 plaque forming units of MVA85A, and followed for 6 months. Adverse events were documented and vaccine-induced T cell responses assessed by IFN-γ ELISpot assay. Antigen-specific CD4 and CD8 T cells were further characterised by a whole blood intracellular cytokine staining and flow cytometry.

Results:
The vaccine was well tolerated and there were no vaccine-related serious adverse events. MVA85A induced potent and durable T cell responses. The magnitude of IFN-γ-expressing T cells after MVA85A vaccination, measured by ELISpot assay, significantly exceeded pre-vaccination levels up to 6 months after vaccination. Multiple CD4 T cell subsets, based on expression of IFN-γ, TNF-α, IL-2, IL-17 and GM-CSF, were induced. Polyfunctional CD4 T cells co-expressing IFN-γ, TNF-α and IL-2 dominated the vaccine-induced response. A novel CD4 cell subset co-expressing Th1 cytokines and GM-CSF was induced. A small subset of CD4 T cells co-expressing Th1 cytokines and IL-17 was also induced, but this subset did not persist up to 6 months post-vaccination. Antigen-specific CD8 T cells were not detected.

Conclusions:
We conclude that MVA85A safely induces the type of immunity thought to be important in protection against tuberculosis in children. This includes induction of a novel Th1 cell subset co-expressing GM-CSF, which has not been previously described in humans.

Title: **THE NOVEL TB VACCINE, AERAS-402, INDUCES A ROBUST AND POLYFUNCTIONAL CD4 T CELL RESPONSE, AND A CD8 T CELL RESPONSE, IN HEALTHY ADULTS**

Authors: Brian Abel[1], Michele Tameris[1], Nazma Mansoor[1], Sebastian Gelderbloem[1], Jane Hughes[1], Deborah Abrahams[1], Lebohang Makhethe[1], Mzwandile Erasmus[1], Marwou de Kock[1], Linda van der Merwe[1], Anthony Hawkridge[2], Ashley Veldsman[1], Mark Hatherill[1], Giulia Schirru[3], Maria Grazia Pau[3], Jenny Hendriks[3], Gerrit Jan Weverling[3], Jaap Goudsmit[3], Donata Sizemore[2], J. Bruce McClain[2], Margaret Goetz[2], Jackie Gearhart[2], Hassan Mahomed[1], Gregory D. Hussey[1], Jerry Sadoff[2], Willem A. Hanekom[1]

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Background and Objective:

Tuberculosis (TB) is a major cause of illness and death worldwide, and it remains a leading infectious killer of young children and adults. Bacille Calmette-Guérin (BCG), the only licensed vaccine against TB, confers some protection against severe forms of TB disease in infants, but demonstrates variable efficacy against pulmonary disease. Since replacing BCG with a novel TB vaccine would be difficult, there is a concerted effort towards employing a heterologous vaccination strategy that improves BCG and boosts the existing BCG-specific response. We investigated the safety and immunogenicity of the boosting vaccine, AERAS-402, in a Phase I study in healthy *Mycobacterium tuberculosis* uninfected adults previously vaccinated with BCG.

Methods:

AERAS-402 comprises a recombinant, replication deficient Adenovirus 35 expressing the mycobacterial antigens Ag85A, Ag85B, and TB10.4. Three escalating doses of AERAS-402 were administered to groups of 10 adults each, and a fourth group received two administrations of the maximum dose. Whole blood was obtained from participants longitudinally, and vaccine-specific T cell responses measured by multi-parameter flow cytometry.

Results:

AERAS-402 vaccination induced a robust CD4 T cell response against the vaccine antigens, which peaked at 28 days post-vaccination. Almost all vaccinees had increased responses to the vaccine antigens compared with their baseline levels. This response was dominated by a polyfunctional population co-expressing IFNg, TNFa, and IL-2. Strikingly, AERAS-402 strongly induced CD8 T cells expressing IFNg and/or TNFa.

Conclusions:

We conclude that AERAS-402 is immunogenic, induces both CD4 and CD8 T cells, and supports further clinical trials assessing the efficacy of AERAS-402 as a boosting vaccine.

Title: **MOTHERS FROM THREE LANGUAGE GROUPS AND THEIR UNDERSTANDING OF CONSENT**

Authors: S. Yasin-Harnekar, Oral Health Centre, Faculty of Dentistry, University of the Western Cape

Objectives:
To determine the mother's understanding of the concept of consent for her child's dental treatment and, child's involvement in decision of treatment.

Method:
The protocol was submitted to, and the ethical clearance was obtained from the Research Committees of the Faculty and the University, and permission from the Clinical Dean of the Dental Faculty to execute the study. Mothers accompanying their children presenting for dental treatment at the Oral Health Centres of Tygerberg and Mitchells Plain were selected.
At the admission desks, the subjects were offered a verbal explanation, and invited to participate. The study questionnaire was replicated in three different languages, namely, English; Afrikaans; and Xhosa. A covering letter gave an explanation of the study. The self administered questionnaire was completed by the mother in the language of her choice. Any questions were addressed by the admission personnel. Refusal to participate did not influence or prejudice the treatment of the child. Names were not recorded to ensure confidentiality.
The questionnaire was mainly closed questions with specific choices. It investigated the mother's knowledge and understanding of the type of consent; and the child's participation in the decision of treatment.
The completed forms were deposited in a box provided at the reception. Data was gathered over a six month period.
The responses were coded; entered in an Excel spreadsheet; and analysed using SPSS version 13.0. Simple descriptive statistics (e.g. frequencies) were calculated and cross tabulation done for the three languages.

Results:
N = 517 mothers (English = 48.9%; Afrikaaans = 38.3%; Xhosa = 12.8%). 60% of children were ≤6yrs and 55.7% presented for their first visit.

TABLE: Frequencies for consent knowledge by language (% YES responses)

Consent (and types)	English	Afrikaans	Xhosa	All mothers
Familiar	68.4	**83.3**	60.6	**73.1**
Implied	9.0	**24.7**	10.6	15.2
Verbal	22.0	16.7	22.7	20.0
Written	**29.8**	13.6	15.2	21.8
All forms	38.0	31.8	36.4	35.5
Aware before today	46.3	46.2	47.2	**46.3**
Dental Procedure				
Examination	73.2	75.8	80.0	75.0
Local Anaesthetic	71.0	75.8	67.2	72.3
Filling	58.0	51.5	48.4	**54.4**
Extraction	80.6	83.8	84.6	**82.3**
Sedation	61.0	76.0	**47.6**	65.1
General Anaesthesia	65.5	66.2	**44.6**	63.1
Child Involved	**47.8**	69.0	66.7	58.3

Conclusion:

Most mothers, irrespective of the language group, are familiar with the word ‘consent’ but not aware of the different types of consent. The highest awareness of consent for dental procedures was for extractions, examination and, local anaesthesia. After the first visit there was a marginal increase in the mother’s knowledge of the types of, and dental procedures requiring consent. The Afrikaans and Xhosa language groups are more likely to want their children involved with the dental treatment decisions.

Title: **EFFECT OF MATERNAL HIV STATUS ON THE OUTCOME OF NEONATES WITH NECROTIZING ENTEROCOLITIS**

Authors: Jonathan S Karpelowsky, Stefanie van Mil, Alp Numanoglu, Ernesto Leva, Alastair J.W Millar

Department: Pediatric Surgery Red Cross War memorial Children's Hospital, University of Cape Town

Aim:
To assess the impact of HIV exposure on survival and extent of disease in necrotizing enterocolitis(NEC)

Patients and methods:
All patients with NEC requiring surgery between June 2004 and June 2008 were analyzed. Three groups were identified; those born to HIV positive mothers, those born to HIV negative mothers and those with an unknown HIV status. Primary outcome measures were survival to discharge. Secondary outcome measures were that of extent of disease.

Results:
109 patients with NEC underwent surgery. The average gestational age of all three groups was 31 weeks and the weight 1413grams. Gestational age, birth weight and day of presentation were similar in all three groups showing no statistical difference. The HIV positive group consisted of 22 patients of which 13(59 %) died, 2(9%) had pan necrosis. The HIV negative group consisted of 48 patients of which 11 (23%) died with 3(6%) having pan necrosis. The remaining group of unknown HIV status consisted of 38 patients of which and 14 died (37%) with 2(5%) pan necrosis. The latter group were not included in the analysis, but comparing the HIV positive and HIV negative group, there was a statistically higher chance of death ($p=0.05$) and odds ratio 4.8. There was no difference statistically in the extent of disease.

Conclusion:
Neonates with NEC born to HIV positive mothers have a higher mortality

Title: **AUDIT OF CHILDREN AWAITING RENAL TRANSPLANTS AT RED CROSS CHILDREN'S HOSPITAL**

Department: Renal and Renal Transplant Units
Red Cross Children's Hospital
Tygerberg Hospital

Authors: T Abdo, L Savage, H Burger, J Wiggelinkhuizen, D Maythem, G Van Durgteren, C Morrison, P Sinclair, P Nourse, M McCulloch, P Gajjar

Purpose:
The Red Cross Children's Hospital provides a renal transplant service to all children south of Gauteng, both state and privately funded. With increasing shortage of cadaver donors and perceived longer waiting times, an audit was undertaken to analyse our current waiting time and critically look at our organ allocation criteria.

Method:
Retrospective analysis of waiting lists and transplant database. Data re demographics, referral source, and waiting times were taken into account.

Results:
Our current list of 18 patients have a mean waiting time of 15.4 months compared to a mean of 9.9 months in the preceding 5 years. Between 2003 and 2008 there were between 12 and 15 patients on the waiting lists. During this time, two patients died while awaiting a transplant. The shortage of cadaver donors is reflected in the longer waiting times for patients on our current waiting list. This highlights the need to strengthen our cadaver donor identification and referral in our own centre, which houses an active ICU and neurosurgical department. We need to enhance our public-private partnership in the sharing of organs with almost 40% of our patients coming from the private sector. As a large proportion of the children on the list are pre-adolescent, a review of our criteria for assessment of suitability of transplant involving the psychosocial team is necessary. The current organ allocation system needs to be challenged in terms of equity towards children. Furthermore we are providing an interprovincial service without the necessary organ resources.

Title: **PREGNANCY FOLLOWING LIVER TRANSPLANTATION DURING CHILDHOOD AND ADOLESCENCE**

Authors: CWN Spearman, E Goddard, MI McCulloch, HN Hairwadzi, MW Sonderup, A Numanoglu, D Kahn, AJW Millar

Department: Red Cross War Memorial Children's Hospital[1], Groote Schuur Hospital[2] and UCT Medical School, Cape Town, South Africa[3]

Introduction:
Improved survival and quality of life following liver transplantation has been associated with increased frequency of pregnancies in female liver transplant recipients. More than 80% of children receiving solid organ transplants will survive to reach adulthood and will consider the option of having children.

Purpose:
We report on the outcomes, complications and management of 5 pregnancies in 4 women who underwent orthotopic liver transplantation during childhood or as adolescents.

Methods:
Retrospective clinical folder audit

Results:
The mean interval between transplantation and pregnancy was 184.8 ± 59.8 months. Indications for liver transplantation include biliary atresia (1), primary hyperoxaluria requiring combined liver and kidney transplantation (1), Budd-Chiari syndrome (1) and autoimmune hepatitis (1). Mean age at conception was 27.6 ± 3.4 years. The mean gestational age was 36.6 ± 1.7 weeks. The mean birth weight was 2672 ± 249g. Immunosuppression was either Cyclosporin (3) or Tacrolimus based (1). No increase in immunosuppression was required during the pregnancies. Complications included fetal distress and rising liver enzymes (2), cholestasis of pregnancy and impaired renal graft function (1) and pre-eclampsia (2) necessitating induction of labour. Modes of delivery were normal vaginal delivery (4) and cesarean section (1). There were no maternal or fetal deaths and no neonatal malformations.

No one experienced rejection during pregnancy, but during the 1st year following delivery, 2 women experienced acute cellular rejection requiring an increase in baseline immunosuppression. There were no graft losses.

Conclusion:
With careful management, pregnancy post liver transplantation can have a successful outcome.

Title: **A MORE CONSERVATIVE SURGICAL APPROACH IS JUSTIFIED IN LOCALLY ADVANCED UROGENITAL RHABDOMYOSARCOMA, A SINGLE CENTRE EXPERIENCE.**

Authors: R.J. Wood, J.S. Karpelowsky, A Davidson, A.J.W. Millar

Aim:

To assess whether a conservative surgical approach is justified in terms of survival and function in locally advanced Urogenital Rhabdomyosarcoma(URS) in children in a developing country.

Method:

A retrospective analysis was performed on all children diagnosed with URS between 1961 and 2008.

Results:

49 patients were reviewed. 26 male (53%) and 23 female (47%). Median age at diagnosis was 3.5yr (10 months-14.3 years). The anatomical sites of origin were: Bladder 15, Paratesticular 13, Vagina 11, Prostate 7, Uterus 2 and Vulva 1. The pathological types were: Embryonal 34 (69%), Botryoid 12 (25%), Alveolar 2 (4%), Not specified 1 (2%). The IRS groupings were: Group 1: 14, Group 2:4, Group 3:28, Group 4:4.

IRS grouping was used to assign treatment to all patients using neo-adjuvant and adjuvant Chemotherapy. Radiotherapy was used for Groups 2- 4. Prior to 1992 surgery was mostly radical for locally advanced disease, and post1992 a more conservative approach focusing on bladder function and genital preservation.. The overall survival was 59% and for the 4 groups; 86%, 50%, 56% and 0% respectively. Closer analysis of group 3 revealed a survival pre-1992 of 42% and post-1992 of 77% (P=0.04, odds ratio for mortality pre 1992 = 6.6)

Conclusion:

In developing countries patients often present with locally advanced disease. The results in this series support the strategy of conservative surgery.

Title: **TREATMENT OF NEUTROPAENIC FEVER AFTER HIGH DOSE ARA-C IN CHILDREN WITH ACUTE MYELOID LEUKAEMIA**

Authors: W MATHIASSEN, M HENDRICKS, F DESAI, A VAN EYSSEN, A DAVIDSON

Department: Haematology/Oncology Service, Red Cross Children's Hospital and the University of Cape Town

Objective:
To review bacterially positive blood cultures of children with acute myeloid leukaemia (AML) after high dose Ara-C to determine if a change in empirical antibiotics (currently piptazobactam and amikacin) is needed and if prophylaxis is warranted.

Methods:
A retrospective analysis of blood cultures following high dose Ara-C over a 12-year period.

Results:
Between 1994 and 2005 78 children were diagnosed with AML. Following high dose Ara-C 26 blood cultures grew a streptococcus in 23 children, mainly strep. viridans. When sensitivities were recorded all were sensitive to vancomycin, while 12 (63%) were sensitive to amoxicillin and 7 were resistant (37%). Three were known to be amikacin sensitive and 12 resistant. Four cultures were positive for gram-negative organisms (E. Coli, Pseudomonas and Klebsiella). All were sensitive to piptazobactam.

Conclusions:
The majority of positive blood cultures following high dose Ara-C for AML grew a vancomycin-sensitive streptococcus that was frequently sensitive to amoxicillin. All gram-negative organisms were sensitive to piptazobactam. There is a need to change amikacin to vancomycin and give oral amoxicillin as prophylaxis following high dose Ara-C. Better dental hygiene and chlorhexidine mouthwash may also help. A prospective randomised trial is planned to see if prophylactic amoxicillin will decrease streptococcal infections after high dose Ara-C in children with AML.

Title: **BLOOD TRANSFUSIONS IN PAEDIATRIC ONCOLOGY IN AN AFRICAN HOSPITAL: WHAT ARE THE INDICATIONS AND COST INVOLVED?**

Authors: Dr Jaco Murray Dr DC Stefan

Department: Tygerberg Children's Hospital/Stellenbosch University

Background:
Red blood cells and platelet concentrates are frequently used in pediatric hematology oncology. There is little literature on the indications and costs of this adjuvant therapy.

Aim:
To retrospectively evaluate the indications, amounts and costs of transfusing blood products in 2008 in the Department of Paediatric Hematology Oncology at Tygerberg Children's Hospital, Cape Town.

Material and methods:
The patient records were analyzed for age, sex, diseases and stage, indications for every for transfusions and type of blood product as well as amount. The costs were obtained from the Blood Bank for each item released for every patient.

Results:
Forty two children with cancer were transfused between one unit and 34 units of blood products per patient, during their treatment in 2008. The total cost of this therapy in 2008 was R941,966. The maximum cost was R 70,682.98 and the minimum R 914. The average expenditure was 24,125.65. The management of leukemias required the highest usage of blood products per patient.

Conclusion:
The use of blood products is indispensable during the treatment of numerous hematology-oncology diseases. Their indications should be specified in internal protocols and their actual use should be audited frequently due to considerable costs.

Title: **DELAY AND CAUSES OF DELAY IN DIAGNOSING CHILDREN WITH CANCER**

Authors: Dr DC Stefan F. Siemonsma

Department: Tygerberg Children's Hospital/Stellenbosch University

Background:
Few studies have investigated delays in diagnosis and treatment among children and adolescents with cancer. Although this has been investigated a few times in more
developed countries, it has never been subject of study in South-Africa. Early diagnosis is fundamental as it allows timely treatment and prevents unnecessary complications.

Aim:
To identify any delay in diagnosing childhood cancer and the causes of this delay
A key question remains: do delays in diagnosis worsen the extent of the disease, or does the extent of the disease influence diagnosis delays? Although the impact of diagnosis delays on the prognosis of children with cancer is still unknown, it has generally been believed that long delays would lead to worse prognosis
This study was conducted to achieve a better understanding of delay in diagnosing childhood cancer. And identify possible causes of delay.

Material and methods:
Combined prospective and retrospective study: 126 patients were included through review of the medical charts, children diagnosed between 2000 and 2009 and 68 interviews with the parents of the patients

R**esults**:
The median total diagnosis delay was 34 days (2-1826). The median patient delay was 5 days (0-457). The median physician delay was 20 days (0-924). The female:male ratio of the cases included was 1:1,37. The median total diagnosis delay was for females 34 days (2-1826) and for males 33 days (2-605). The median patient delay was for females 5 days (0-153) and for males 5 days (0-457). The median physician delay was for females 17 days (1-924) and for males 22.5 days (0-442). Gender did not have a significant influence on the total diagnosis delay (Mann-Whitney U, p=0.73) , patient delay (Mann-Whitney U, p=0.29) or physician delay (Mann-Whitney U, p=0.32). The mean age at the start of the symptoms was 5,9 years old (std.dev.=4.0064). The age at start of the symptoms did slightly influence the delay. The total diagnosis delay (Spearman, r=0.13 p=0.08) and patient delay (Spearman, r=0.15 p=0.07) increase slightly (trend for a positive correlation, but not statistically significant).

Conclusion:
The most common misdiagnoses seem to be different infections and constipation, which are most often treated with antibiotics. There is considerable delay in diagnosing childhood cancer in South Africa with a physician delay of 17 days on average. The findings of our unit should be correlated with other South African centers. An urgent need is to address the issue of awareness in childhood cancer and education of nurses and doctors in warning signs should become a national priority.

Title: **THE USEFULNESS OF BLOOD MARKERS IN SCREENING FOR SOLID TUMOUR RECURRENCE**

Authors: Farai Mabunda[1], Achita Singh[1], Lisa Levenberg[1], Alan Davidson[2]

Department: 1 UCT Medical School 2nd Year

2 Haematology/Oncology Service, Red Cross Children's Hospital and UCT

Objective:
The use of serum tumor markers forms part of the routine follow up of paediatric oncology patients with solid tumors. However, there is little research to support their value in detecting recurrent disease in the absence of signs and symptoms. We set out to examine: [1] How often relapses are identified by elevated tumour markers alone. [2] How many assays are required to identify a single case of relapse and what costs are involved. [3] Whether serum tumour marker assays in the routine follow-up of patients with malignancy is ultimately beneficial and cost effective.

Methods:
A retrospective folder review was conducted on patients who presented to the Red Cross Children's Hospital between 1991 and 2006 with solid tumours usually associated with an elevated Lactate Dehydrogenase (LDH) or Alpha-fetoprotein (AFP). Patients who did not achieve remission or who were lost to follow up were excluded.

Results:
Of the 353 folders analysed, 174 patients qualified for the study. Of these, 41 patients were found to have relapsed. Eighteen (44%) of these relapses were detected by clinical presentation or imaging; five (12%) were detected by blood markers alone and 18 (44%) were diagnosed using both methods. Thirty six were LDH-associated tumours and only three (8%) of these were detected by marker alone. Of the five AFP-associated tumour relapses, two (40%) were detected by marker alone. The number of assays (and cost) required to detect a single relapse was 32.4 (R1226.02) for LDH-associated tumours and 50.6 (R4680.50) for AFP-associated tumours.

Conclusions:
Elevated markers are less efficient at detecting relapse than clinical evaluation and imaging, and this should be weighed up against the invasive nature of taking a blood sample and the inconvenience of attending routine follow-up. AFP monitoring is more expensive but better than LDH at detecting relapse.

Title: **CHANGING OUR APPROACH - THE TRANSITIONAL JOURNEY OF OVER-AGE PATIENTS FROM PAEDIATRIC TO ADULT FACILITIES**

Authors: Rozanne Bihl, Lyn Starck, Yolande Jacobs, Angela Leonard and Minette Coetzee

Transition is the purposeful, planned movement of adolescents and young adults with chronic physical and medical conditions from child-centred to adult-orientated health care systems.[1]

Young people aged between 12 and 20 account for up to 15 per cent of South Africa's total population, and an increasing number of chronically ill children are surviving into young adulthood. Specialist services at Red Cross Children's Hospital have traditionally cared for children far beyond the 12 year-old age limit but there is a growing need for intentional transition programmes to ensure a seamless transfer and transition from children's to adult health care services.

During 2009 the Spina Bifida team took on the challenge of improving the transition of care. The Child Nurse Practice Development Initiative provided a forum where the complex issues surrounding the practical nursing care of children could be explored by the nurses on this team. The forum also served to draw together a number of transition projects occurring in different departments.

The objective of this project was to assess current practice, by exploring and improving the transition process from paediatric to adult facilities and then to facilitate the transition of adolescents and their families in ways that sustain care at the adult facility and therefore improve continuity and outcomes of care.

The simultaneous participation of nurses and multidisciplinary health care professionals from different units in adult and paediatric services was first in this process. The action research process ensured a rigorous tracking of the collaborative improvement of care during the transitioning process.
This presentation will present the process as well as the lessons learnt in establishing a sustainable transition practice model.

[1] Blum R, Garell D,Hodgman C (1993) Transition from child-centred to adult health-care systems for adolescents with chronic conditions: a position paper of the Society for Adolescent Medicine, *Journal Adolescent Health*, 14, pp. 570-576.

Title: **PAEDIATRIC NURSING CARE FOR THE CHILD WITH BURKITT'S LYMPHOMA AT RED CROSS CHILDREN'S HOSPITAL CAPE TOWN**

Authors: Z. Brown, C. Jefthas

Department: Hematology / Oncology Service, Red Cross Children's Hospital, School of Child & Adolescent Health, University of Cape Town

Burkitt Lymphoma is the most common Non-Hodgkin's Lymphoma in African children. Specific nursing care needs for children with Burkett lymphoma focuses on chemotherapy related complications, in particular tumorlysis syndrome, mucositis and febrile neutropaenia.

This encompasses anticipating, assessing and planning the management of these patients with regard to administration of chemotherapy, fluid balance, enteral and parenteral feeding, pain control and the care of central lines.

Optimal care of theses patients can only be achieved where there is detailed and specific communication between the paediatric oncologist, nursing staff, allied medical professional and the patient's family.

Title: **INDUCTION OF ROBUST POLYFUNCTIONAL T CELL RESPONSES FOLLOWING VACCINATION OF HEALTHY ADULTS WITH THE GSK'S CANDIDATE TB VACCINE M72/AS01$_E$**

Authors: Cheryl L. Day[1], Nazma Mansoor[1], Michele Tameris[1], Sebastian Gelderbloem[1], Marwou de Kock[1], Hennie Geldenhuys[1], Lebohang Makhethe[1], Mzwandile Erasmus[1], Blessing Kadira[1], Michele van Rooyen[1], Opokua Ofori-Anyinam[2], Marie-Ange Demoitié[2], Philippe Moris[2], Patricia Bourguignon[2], Evi De-Ruymaekers[2], Pascal Mettens[2], Joe Cohen[2], Ripley Ballou[2,3], Tony Hawkridge[1,4], J. Bruce McClain[4], Hassan Mahomed[1], Gregory D. Hussey[1], Willem A. Hanekom[1]

Department: [1]South African Tuberculosis Vaccine Initiative, Institute for Infectious Diseases and Molecular Medicine, University of Cape Town, Observatory 7925, South Africa, [2]GlaxoSmithKline Biologicals, Rixensart 1330, Belgium, [3]Bill & Melinda Gates Foundation, Seattle, WA 98102, [4]Aeras Global TB Vaccine Foundation, Rockville, MD 20850

Tuberculosis (TB) is a major cause of morbidity and mortality worldwide, however the only currently licensed vaccine for TB, Bacille-Calmette-Guérin (BCG), has limited efficacy in protecting against pulmonary TB. In this phase II clinical trial, we investigated the safety and immunogenicity of the GlaxoSmithKline vaccine candidate, M72/AS01$_E$, in 45 adults from a TB-endemic region of South Africa. M72 is a fusion protein of Mtb32A and Mtb39A with the GSK proprietary AS01$_E$ adjuvant system. Healthy adults with baseline tuberculin skin test reactivity ranging from 0-55 mm (median 16 mm) were enrolled. Two doses of M72/AS01$_E$ were administered 30 days apart. No serious adverse events related to the vaccine were reported. Robust M72-specific CD4 and CD8 T cell responses were induced, as detected by multiparameter flow cytometry in whole blood and PBMC-based assays. The response was boosted by the second vaccination. M72-specific CD4 T cells produced all possible combinations of IFN-γ, IL-2, TNF-α, and CD40L; IL-17-producing CD4 T cells were induced as a discrete population in whole blood. M72-specific CD8 T cells peaked 7 days post-vaccination and were predominately monofunctional. The frequencies of M72-specific CD4 and CD8 T cell responses measured at day 210 post-vaccination remained significantly higher than baseline values. In conclusion, M72/AS01$_E$ is safe in mycobacteria-exposed adults, and induces robust, long-lived, polyfunctional populations of M72-specific T cells.

Title: **LODOX-STATSCAN IN THE DIAGNOSIS OF CHILDHOOD TUBERCULOSIS**

Authors: R Daya, MA Kibel

A common feature of primary TB is narrowing of major airways due to adhesion and pressure from involved glands. Demonstrating this generally requires high KV films with resulting exposure to a large radiation dose.

A study comparing Lodox-Statscan films with conventional computerised radiographs in children with proven or suspected TB is still ongoing, but the study has already shown greatly enhanced clarity of airways in the Lodox method. This presentation will demonstrate several examples of such airway narrowing.

Title: **DELAYING BCG VACCINATION FROM BIRTH TO 10 WEEKS OF AGE RESULTS IN AN ENHANCED MEMORY CD4 T CELL RESPONSE**

Authors: Benjamin M. N. Kagina[1], Brian Abel[1], Mark Bowmaker[1], Thomas J. Scriba[1], Sebastian Gelderbloem[1], Erica Smit[1], Mzwandile Erasmus[1], Nonhlanhla Nene[2], Gerhard Walzl[2], Gillian Black[2], Gregory D. Hussey[1], Anneke C. Hesseling[3], Willem A. Hanekom[1]

Department: [1]South African Tuberculosis Vaccine Initiative (SATVI), Institute of Infectious Diseases and Molecular Medicine and School of Child and Adolescent Health, University of Cape Town, Cape Town, South Africa.
[2]Molecular Biology and Human Genetics, Department of Biomedical Sciences, Stellenbosch University, South Africa
[3]Desmond Tutu TB Centre, Department of Paediatrics and Child Health, Faculty of Health Sciences, Stellenbosch University, Tygerberg, South Africa

Background:
In most tuberculosis (TB) endemic countries, bacillus Calmette Guérin (BCG) is usually given around birth to prevent severe TB in infants. The neonatal immune system is immature. Our hypothesis was that delaying BCG vaccination from birth to 10 weeks of age would enhance the vaccine-induced immune response.

Methods:
In a randomized clinical trial, BCG was administered intradermally either at birth (n=25) or at 10 weeks of age (n=21). Whole blood was collected at 10 weeks, 20 weeks, and at 1 year of age, to measure vaccine-specific T cell responses. BCG-specific CD4 and CD8 T cell responses subsets were assessed for their intracellular cytokine expression profiles and their associated memory phenotypes using the markers, CD45RA and CCR7. Infants infected with *M.tuberculosis* over the first year of life were excluded from analysis.

Results:
Both groups of infants had a robust BCG-induced CD4 T cell response 10 weeks after vaccination, with those in the delayed vaccination group demonstrating higher frequencies of most CD4 T cell subsets, compared with the birth vaccination group. Strikingly, at 1 year of age, infants who received delayed vaccination had higher frequencies of BCG-specific CD4 T cell subsets, particularly polyfunctional T cells co-expressing IFN-γ, TNF-α and IL-2.

Conclusions:
Delaying BCG vaccination from birth to 10 weeks of age enhances the quantitative and qualitative BCG-specific T cell response, when measured at one year of age. Our results suggest that the age at which BCG is administered may be a critical variable influencing the vaccine induced immune responses in infants.

Title: **INFECTION CONTROL THE MAINSTAY OF SUSTAINED HOME-BASED PERITONEAL DIALYSIS**

Authors: Johanna Michaels, Jessica Mtetwa, Angela Leonard and Minette Coetzee

The Child Nurse Practice Development Initiative provides a forum where the complex issues surrounding practice and the processes of nursing care of children can be explored by nurses in specific settings. The quality of healthcare practice depends on the environment as well as the practice of providers, ward staff and parents.

Ward E2 is a busy sub-speciality ward with nephrology as the main speciality. Children who require complex procedures like haemodialysis and peritoneal dialysis along with those waiting for or post-transplant are nursed there. Home-based dialysis provides some normality for children with chronic kidney failure, but each infection means re-hospitalisation and the risk of further kidney damage. Successful home-based care of technology dependent children depends on meticulous practices which must be as close as possible in the ward to how they need to be at home. While some children can go home to their families, others require care in home-from-home settings like St Joseph's. This can facilitate or complicate their care.

The aim of the project was to track the number of infections in the last year, maintain this data in 2009 and to revisit practices around the care of children with peritoneal dialysis. This included the education and practice of nurses, parents and children about home peritoneal dialysis in order to decrease the rate of peritonitis in children that had been discharged from hospital.

The literature indicates that continuous quality improvement programmes are all essential for the prevention of peritonitis episodes. Once presented with the existing evidence base for best practice, the team aimed to decrease the number of readmissions to the ward.

This poster will present the results of this project with their implications & limitations.

Title: **IMPROVING PATIENT SAFETY BY INCREASING AN AWARENESS OF CHEMOTHERAPY RELATED EXTRAVASATIONS IN WARD G1, THE ONCOLOGY HAEMATOLOGY WARD**

Authors: Dorothy Moodie, Angela Leonard and Minette Coetzee

Extravasation of chemotherapeutic agents result in local pain, discomfort, tissue damage and extensive necrosis. The overall incidence of vesicant agent extravasation reported in the literature ranges between 0.1 and 6.6%. Although there are no preventive measures for extravasation, recognizing it's occurrence and perfoming early interventions are important steps to halt tissue damage and reduce the chance for disability and disfigurement. In Ward G1, the oncology haematology unit, each extravasation is considered one too many. Early detection and prevention of local tissue damage became the quality improvement project tackled by theG1 team in 2009.

An initiative of the Child Nurse Practice Development Unit, 2009 involved a shift of focus towards using quality indicators & helped nurses see what tasks they were doing well and what they could do better. Berwick (2004) states that the only way to 'fix' healthcare is to bring our practice into the open and to measure the outcomes of our interventions. This *project's* objective was to improve patient safety for children attending ward G1 for chemotherapy treatment, by increasing an awareness of chemotherapy extravasations and decreasing the number of extravasations that occur.

The methods used were initially to check the current charts to see by what methods and how regularly IV sites were checked. This lead to the initiation of a chart re-design as well as a tracking system & an increased awareness of extravasation amongst nurses. This project offered the opportunity for nurses to verbalise their knowledge, to receive guidance on checking drip sites, to receive information and provide more support to the registered nurse in the treatment and procedure room. A custom incidence-reporting sheet was designed to be used once a child suffered an injury due to chemotherapy & to track what happens afterwards. Staff were required to complete the form daily and comment on severity, improvement and/or deterioration of the drip site, swelling and stiffness at the site and distal to the site.

This poster presentation will present the initial results, limitations and triumphs of this project.

Title: **THE INFLUENCE OF MOTHER-INFANT SKIN-TO-SKIN CONTACT VERSUS MOTHER-INFANT SEPARATION ON SLEEP STATE AND HEART RATE VARIABILITY IN HUMAN NEONATES.**

Authors: Barak Morgan[1], Alan Horn[2], and Nils Bergman[3]

Department: *[1]MRC/UCT Medical Imaging Research Unit, Department of Human Biology, University of Cape Town, SA.*
[2]Neonatal Medicine, Department of Paediatrics, University of Cape Town, SA.
[3]Department of Human Biology, University of Cape Town, SA.

Background:
Current practice in many neonatal facilities is to separate newborn infants from their mothers, by placing the infants in a cot. If the infants are preterm, sick or unstable then they are usualy separated further by being placed in an incubator in a room separate from the mother. Evidence from non-human primates and other mammals including rats, mice and pigs, shows homeostatic and cardiorespirartory dysregulation following separation, with later social maladaptation. Bergman et al. found greater cardiorespiratory stability in preterm neonates managed with skin-to-skin contact (SSC) against their mothers' skin compared to infants managed during mother-infant-separation (MIS) in an incubator. Heart rate variablity (HRV) reflects central autonomic activity and in certain contexts low / high frequency components may distinguish sympathetic / parasympathetic contributions to HRV. In adults increased sympathetic : parasympathetic ratio as measured by HRV has been reliably correlated with risk and mortality in cardiac disease. Autonomic state differences between SSC and MIS may mirror those in mammalian research, and if sustained during infancy may influence outcome.

Objective:
Our objective was to compare infant sleep state and HRV in SSC and MIS in mother-newborn dyads 48 hours after birth.

Methods:
15 full term infants were observed during an hour of SSC and an hour of MIS. ECG and EEG were continually recorded onto a computer and infants were assessed with the Anderson behioural state scale (ABSS) whenever there was a change in state.

Results:
There was no significant difference in sleep duration comparing SSC to MIS, but infants in SSC spent a significantly greater proportion in ABSS sleep state 1 (deep sleep) ($p=0.001$). Time averaged HRV was increased across all sleep states and all frequencies during MIS. This difference was significant during sleep state 2 and highly significant during sleep state 3. EEG analysis is ongoing and will be presented separately.

Conclusion:
MIS was associated with significantly decreased duration of deeper sleep and with significantly increased heart rate variability compared to SSC. Although the HRV results do not allow separation of sympathetic / parasympathetic components, the overall effect of MIS/SSC on neonatal autonomic activation is significant. Further research in this field may elucidate the role of the autonomic system in neonatal health and illness.

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Title: **REVISITNG SAFETY: CREATING A SAFE BED-SPACE FOR CHILDREN ADMITTED TO C1 PICU**

Authors: Marleen Petersen, Leilani Titus, June Cohen, Charmaine Stanley, Angela Leonard and Minette Coetzee

The premium for beds in the C1 ICU is high. Almost 1400 children were admitted to the ICU in 2008. While some children may stay as long as 8 months, most children require this level of care for between 2-4 days. The turnover on beds is high, and the high acuity increases the safety risks to critically ill children significantly.

Outbreaks of MRSA and Acinetobacter pose formidable challenges to the care of critically ill children, infection control and antibiotic control measures may have the greatest impact on these bacteria. The high turnover, patient proximity and numerous staff working in the complex care setting of the ICU pose increasing challenges to quality care and safety. In March 2009 a team of nurses in the ICU took up the Boston-based Institute of Health Care Improvement suggestion to improve safety and therefore quality of care, by working towards '*no needless waste'* and '*no needless infection'.*

This project offered an opportunity for the team to consider their current practice around each bed space, consider their observations and systematically engage the rest of the ICU team to shift their practice. The objective of the project was to re-order the bed space environment of each child to decrease waste and reduce infection rates and risk using action improvement cycles. Rapid appraisals and staff surveys were carried out to track progress and to direct the next actions.

As a result the ICU team decreased waste by reconsidering stock in the bedside carts and developed unit specific norms for their contents. The infection management aspects included a renewed focus on hand hygiene, and eliminating unintentional harbouring of micro-organisms, including a review of the method, time and movement during hand washing, wearing of jewellery and the use of cellular telephones in the ICU.

This poster will describe the process of implementing an action research cycle and the outcomes to date in the ICU.

Title: **NURSING POST OPERATIVE CARDIAC CHILDREN WITH PULMONARY HYPERTENSION - THE ART OF MAINTAINING A BALANCE**

Authors: Marleen P. Petersen, Susan M. Carolus and Shireen Felix

Introduction:

Pulmonary hypertension (PHT) is a relatively common life-threatening peri-operative problem in paediatric cardiac surgery. It is essential that Paediatric Intensive Care Unit (PICU) nurses are competent to recognize and appropriately manage PHT. A full understanding of precipitating factors for PHT together with the ability to differentiate between pulmonary hypertensive events or crises is essential for PICU nurses. "The better the nurse's understanding of the child's pre-operative condition, surgical procedures and potential postoperative complications, the more able that nurse will be to anticipate, recognize and treat postoperative complications" Hazinski, (1999).

Aim:

To discuss the role of the nurse in the management of post operative PHT by eliminating factors that promote pulmonary vasoconstriction and instituting measures that promote pulmonary vasodilation.

Method: Case Presentation

A 3 month old infant was admitted to PICU post repair of supracardiac total anomalous pulmonary venous drainage (TAPVD). She was initially haemodynamically stable but developed episodes of pulmonary hypertension.

Various strategies were used to limit stimulation of PHT including control of pain and agitation, limitation of routine suctioning and precautionary measures before suctioning. Other strategies included management of fluids, pharmaceutical management of PHT using magnesium chloride, pulmonary vasodilators, moderate alkalosis and the prevention and management of sepsis.

A multi-disciplinary team approach is essential and a collaborative project with US-based Children's HeartLink provided support.

Conclusion:

This case presentation will provide an understanding of the role of nurses caring for postoperative cardiac children with PHT. It will describe how general nursing and directed medical therapies are manipulated to maintain the balance and improve patient outcomes.

Title: **EVIDENCE TO PRACTICE - 2- 4- 6 RULE OF NIL PER MOUTH DURING THE PRE OPERATIVE PERIOD AT RED CROSS WAR MEMORIAL CHILDRENS' HOSPITAL**

Authors: Angeline Schrikker, Marilyn Fuchs, S Pirie, Angela Leonard and Minette Coetzee

In 2008, 8633 children had surgery or investigative procedures in the theatres of Red Cross War Memorial Children's Hospital. The peri-operative period remains a high risk period and while the emphasis may be on keeping a child nil per mouth, any delays or changes in an unpredictable theatre slate could mean prolonged fasting and unintended medication gaps. The excessive distress of a thirsty and anxious child may be very visible, but less visible are changes in pH, stress hormone production and dehydration, all of which increase pre-operative risks.

An initial survey in surgical wards revealed different prescriptions and practices around pre-operative practices which initiated a collaborative practice improvement project with the Child Nurse Practice Development Initiative to improve and standardise nursing practice during the pre-operative period.

The aim of the project was to improve the pre-operative management of children undergoing surgery at Red Cross War Memorial Childrens' Hospital by tracking the length of time children remained nil per mouth prior to surgery, and the length of time before surgery that premedication was administered. The rationale was that improved management in the pre operative period results in increased comfort and hydration. By implication, these outcomes would also decrease anxiety for the child and their family in the pre-operative period.

The process of tracking immediately encouraged more attention to the nil per mouth regime and increased attention to the administration of written prescriptions of pre-operative medication. A review of the paediatric literature revealed international evidence-based guidelines that suggest shortened preoperative fasts do not increase the risk of a harmful event for the child.

While the project encountered a variety of hurdles, it resulted in measurable practical improvements. This poster will present these results and highlight the challenges of shifting practice when a variety of departments and wards are involved.

Title: **THE ROLE OF TLR6 POLYMORPHISMS IN INNATE IMMUNE RESPONSES TO MYCOBATERIA**

Authors: Muki S Shey[1], Mark Bowmaker[1], Elizabeth Smith[1], Thomas J. Scriba[1], Marwou de Kock[1], April K Randhawa[2], Thomas R Hawn[2], Willem A Hanekom[1]

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Toll-like receptors (TLRs) recognise pathogen associated molecular patterns derived from invading microorganisms such as *Mycobacterium tuberculosis* (Mtb). These molecules are critical regulators of the innate immune response; it is therefore likely that polymorphisms associated with these receptors may result in altered immune responses to pathogens like Mtb. Such associations between TLR2 and TLR4 variations and differential responses to Mtb have been reported.

In this study, our objective was to determine whether single nucleotide polymorphisms (SNPs) in TLR6 are associated with altered immune signaling to Mtb. The TLR6 coding region from 100 South African volunteers was sequenced and polymorphisms identified. Functional consequences of polymorphisms were assessed by determining IL-6 production in stimulated whole blood, and by determining NF-κB signaling activity *in vitro* after overnight transfection of HEK293 cells with TLR variants, and stimulated with irradiated Mtb lysate, Bacille Calmette-Guerin (BCG), mycobacterial lipopeptides or TLR6 ligands.

Ten TLR6 SNPs were identified, of which one, T34A (F12I), had not previously been described. The nonsynonymous SNP, C745T (P249S), and the synonymous SNP, G1083C (T361T), significantly altered IL-6 production upon stimulation with Mtb lysate and TLR6 ligands. The 745TT and 1083CC genotypes were associated with lower IL-6 levels when compared with the 745CC and 108GG genotypes, respectively, whereas heterozygotes (745CT and 1083GC) produced intermediate levels of IL-6. Transfection of HEK293 cells with the wild type plasmid containing the 745CC sequence led to a substantially higher degree of NF-κB signaling when compared with cells transfected with the 745TT variant construct.

We conclude that TLR6 may regulate innate immune responses to Mtb, owing to the observation that SNPs in the coding region alter innate immune responses to Mtb, BCG, and mycobacterial lipopeptides.

Title: **PALLISTER-KILLIAN SYNDROME - A CASE STUDY.**

Authors: Stuhlinger M, Stephen LXG.

Pallister- Killian Mosaic Syndrome is a rare chromosomal disorder caused by the tetrasomy of the 12p chromosome pair. Major symptoms may include severe mental retardation, a coarse face with high forehead, sparse hair on the scalp, an abnormally wide space between the eyes, a broad nasal bridge with a high vaulted palate and streaks of melanotic skin discolouration.

The distinct pattern of anomalies in the Pallister-Killian Syndrome enables the clinician to make a diagnosis on the basis of clinical manifestations alone.

Objectives:
Our object was to examine such a case of possible Mosaic tetrasomy 12p and demonstrate how it is possible to make a diagnosis on clinical observations alone.
We attempted to formalize a Dental Management Regimen for such patients.

Methods:
After obtaining the necessary consent, the patient was examined and the clinical data recorded. Photographs were taken. Different characteristic manifestations were looked for and compared to the classical case description.

Results:
The patient displayed a number of the classical features of the Pallister-Killian Syndrome. Mental retardation, stunted growth, an anteverted nose, high palate, melanotic skin-discolouration and delayed eruption of teeth were all present.
The diagnosis was confirmed by genetic testing at the Red Cross Children's' Hospital.
(UCT)

Conclusion:
Clinical diagnosis of certain syndromes could greatly accelerate the treatment planning and subsequent treatment of these patients.