Proceedings of the Waikato Clinical School Biannual Research Seminar, 10 March 2011

The evolution of a Waikato community heart failure service – the first year

AJ Bell¹, V Gibbons², G Devlin¹, R Fisher¹, K Buswell³, M Davis¹ R Lawrenson²

¹Waikato District Health Board
²Waikato Clinical School, University of Auckland
³Te Kuiti General Practice

Late 2009, a community based Integrated Heart Failure Service was commenced in Waikato in two rural pilot sites. The aim of the service was to improve, jointly with primary and secondary care, the diagnosis and management of HF in the community.

Data was collected on patients with a coded primary care diagnosis of heart failure. Each patient was assigned to a pathway considered appropriate to the severity of HF. The service was evaluated with the aim to optimise evidence based management of HF.

During 2010, 407 patients with a diagnosis of heart failure had baseline data collected (50% male, 54% NZ European and 31% Māori). The median age at HF diagnosis was 66.5 years; Non Māori 70 years and Māori 61 years. Only one in three at baseline had a BNP test and/or echo within a year of their diagnosis. Of the 270 who have been assessed by the service; 132 (50%) had a clinic review, 14% had HF but no input was required, and 20% did not have a HF diagnosis. Of the 132 reviewed in their local rural clinic (99% attendance rate); 98% had an echo performed within a week prior to their review (65% of whom had not had a previous echo), and two thirds had their medication optimised.

This service has improved diagnosis and management of heart failure in the community. It has increased access to Echo for primary care and has aided improved access for patients to heart failure services.

Is an unpredictable food supply bad for your health?

AL Jaquiery¹²; T Postelnik³; V Alderson-Wallace³; F Bloomfield²³; C Wall³.

Waikato Clinical School¹, Liggins Institute² and Faculty of Medical and Health Sciences³, University of Auckland

Obesity and type 2 diabetes are increasing health problems in lower socioeconomic groups. Shift workers also have a higher rate of metabolic disease compared with the non-shiftworking population. Eating patterns that vary unpredictably from day to day may affect metabolism in ways that contribute to the development of adverse health outcomes. This may be a particular problem for young children, who are dependent on others to provide their meals, and in whom appetite regulating pathways may still
be developing. We report two studies: the first investigating the metabolic effects of an unpredictable food supply in juvenile lambs; and the second, a pilot study looking at eating patterns in health care workers on rotating shifts.

**Methods:** 1. Prepubertal female lambs were randomly assigned to receive, for 6 weeks, maintenance feed given twice daily in equal portions (C; n=24), or the same weekly amount in aliquots of variable size at unpredictable times (U; n=20). Pre and post intervention, glucose and insulin tolerance were assessed by intravenous glucose tolerance test (IVGTT) and insulin tolerance test (ITT), and areas under the curve (AUC) calculated. Groups were compared using t test and repeated measures ANOVA. Values are mean±SEM. 2. Volunteer nurses and junior doctors on shift work at Rotorua Hospital were recruited and filled out a 2 week food diary, questionnaire on shift work and had basic body measurements taken. Data were analysed for: variation in meal and snack frequency between different shift types and days off, variation in energy and nutrient intakes between different shift types and days off, and relationships between snack/meal frequency, energy intake and BMI.

**Results:** 1. Mean weight gain was approximately 17% in both groups (C 5.6±0.6kg; U 5.1±0.4kg). Post intervention, IVGTT glucose AUC was increased in the U group by 20%, with failure to return to baseline concentrations in the second hour (glucose AUC C 832±32, U 987±18 mmol.min.l⁻¹, p<0.001); insulin response was significantly decreased (RM ANOVA change over time x group p=0.001). This was not associated with start or current weight or total weight gain. Insulin tolerance was not different between groups. 2. Nurse participants had mean BMI of 30.2 kg/m², with 75% overweight or obese. Meal frequency across shifts was variable in approximately half the participants. Sugar intake as % total energy was twice RDI on all shifts in both nurses and female junior doctors, while male junior doctors had increased sodium intake (150% RDI). Junior doctors had variability of both snack and meal frequency variability across shifts.

**Conclusion:** An unpredictable food supply in young animals impaired glucose tolerance during a period of rapid growth even when food quality was high and weight gain not excessive. This may have significant public health implications particularly for societies in which food insecurity is prevalent. Erratic eating patterns are also observed in shift workers, and are likely to contribute to their increased risk of metabolic syndrome. Health workforce planning should include further study into this potentially remediable health issue.

**Growing up in New Zealand: Before we are born**

**Atatoa Carr P, Morton SMB, Grant C, Robinson E, on behalf of the Growing Up in New Zealand research team.**

Growing Up in New Zealand is a longitudinal study that aims to determine developmental trajectories, across multiple levels of influence and over time, for the current generation of New Zealand children.

All pregnant women due to give birth between April 25th 2009 and March 25th 2010, from the Auckland, Counties Manukau and Waikato DHB regions were eligible to participate in Growing Up in New Zealand and this paper describes cross-sectional
data gained from the first data collection wave: face-to-face interviews with approximately 7000 recruited cohort families. Outcomes relating to pregnancy behaviour, access to services, and intentions for the child after birth (such as for breast feeding, childcare and immunisation) highlight the importance of the antenatal period for population health and equity, and the ability for this study to provide population relevant evidence.

Growing Up in New Zealand is unique: collecting data from both parents, starting antenatally, and including significant numbers of Māori, Pacific and Asian children as well as European and other New Zealanders. Furthermore, a conceptual framework that is grounded in lifecourse epidemiology provides this study with a comprehensive picture of child development to contribute to policy (and community) development now and into the future.

**Effects on quality of life of prostate cancer brachytherapy: a look at patient outcomes**

D de Jong, HM Conaglen, LK Tyrie, C Hartopeanu, JV Conaglen

Sexual Health Research Unit, Waikato Clinical School, Hamilton.

Prostate cancer is now the most common cancer found in men. Although many types of prostate cancer are slow growing, a significant percentage is fast growing and aggressive, necessitating treatment. This study investigated the impact of prostate cancer treatment, specifically radiotherapy in the form of brachytherapy with adjunct beam therapy, as well as the impact of androgen deprivation therapy (ADT), on quality of life.

The study analysed data from 161 men, aged between 48 and 84 years, with various grades of prostate cancer, who underwent brachytherapy. Participants’ quality of life was measured over a period of approximately 2 years using the EORTC-QLQ30, The EORTC-QLQPR25, and the IPSS. We also examined the impact of ADT on these quality of life and symptom measures.

Several aspects of quality of life are affected. Physical function, role function and social functioning decreased significantly over time. A sub-set analysis showed there are differences in short and long term effects with respect to aspects of quality of life. We also found that ADT contributes to worsened short term function but not longer term impact on some aspects of quality of life. In addition ADT affected IPSS scores during treatment, but these effects varied with age group.

This analysis of the two year effects of this treatment raises questions relating to the longer term impact of the therapy. Since the literature is inconclusive on some aspects of longer term impacts, the data collection for this treatment group is ongoing.
Services Under Challenge: an exploratory study of critical success factors in meeting high and complex needs of people in mental health care

J Kidd & D Lampshire, Waikato Clinical School, University of Auckland, New Zealand.

This project emerged from concerns about service users with ‘high and complex’ unmet needs often presenting repeatedly to mental health, ED and medical services, or being brought in by police. This group are frequently very hard to engage with care teams and treatment. Given the paucity of research and plethora of expert opinions and government inquiries that address this area, we chose a broadly focused methodology to discover what happened in services that deliberately changed their delivery for the benefit of this group of service users.

Data collection involved 39 semi-structured interviews (16 with service managers and keyworkers, and 23 with service users). Participating services included three DHB providers and five non-government organisations across the middle and upper North Island. Data were inductively analysed using themes.

The key findings from this research are a) the successful services were not clinically focused, instead interpersonal and inter-agency relationships are prioritised, with the goal of improving the social determinants of distress/mental illness; b) indicators of success included the quality of the service user-carer relationship, achieving personal goals, evidence of engagement with treatment, and reduced reliance on inpatient or acute services; c) what may be clinically perceived as a complex conglomerate of problems is likely the combination of two quite different concepts – mental distress symptomology and loss of well-being.

This exploratory study suggests that a focus on the social determinants for mental health may be important in order to achieve engagement with treatment and positive mental health outcomes for this complex, high need population.

A study of the complications of Testosterone Undecanoate (Reandron™) Replacement Therapy for male hypogonadism in a cohort of 214 men

J Kamp, HM Conaglen, R Paul, T Yarndley, C Barea, MS Elston, JV Conaglen.

Department of Endocrinology, Waikato Hospital, New Zealand.

Three monthly IM injections with 1000mg testosterone undecanoate (TUD) is the current gold standard for treatment of male hypogonadism. The early literature recommended no alteration of dose with 10-14 weekly intervals and no significant increase in erythrocytosis, prostatic disease or dyslipidaemia with testosterone undecanoate, which have been reported adverse effects associated with previous injectable testosterone esters. This has not been the local experience of our Endocrine Unit at Waikato Hospital or in recent studies.
We performed a retrospective analysis of all 214 adult patients with male hypogonadism treated with testosterone undecanoate for >12 months since 2008 at Waikato Hospital.

Following one year of TUD treatment >70% had trough testosterone levels in the normal range (9-30nmol/L). Dose alteration was required in 23% (n=49) from the standard 1000mg and 33.3% (n=72) required dosing intervals outside the recommended 10-14 weeks. Erythrocytosis (Hb > 175g/L and/or Hct > 0.52) developed in 20% (n=43) requiring alteration of treatment. Additionally 24.6% (n=28) had a significantly elevated PSA (>4µg/L or increase >1.4µg/L) with 6.1% (n=13) requiring urology input. There was no significant reduction in mean HDL (p=0.334), or significant alteration in mean LDL (p=0.375) or mean TG (p=0.948). Significant other adverse effects were reported in 3.3% (n=7).

Testosterone undecanoate replacement in male hypogonadism was associated with a significant rate of erythrocytosis and prostatic disease in our cohort, and required significant dosing and interval changes contrary to the early literature and consistent with recent data.

Biochemical Markers of Cardiac Dysfunction Predict Mortality in Acute Exacerbations of COPD

CL Chang1, SC Robinson2, GD Mills3, GD Sullivan1, NC Karalus1, JD McLachlan1, RJ Hancox1,4.

1Department of Respiratory Medicine, Waikato Hospital, 2Department of Anaesthesia, Waikato Hospital, 3Department of General Medicine, Waikato Hospital, 4Preventative & Social Medicine, University of Otago.

Retrospective studies suggest that plasma levels of NT-proBNP and cardiac troponin T are often elevated in patients with acute exacerbations of COPD and are associated with increased mortality. We investigated these cardiac biomarkers in an unselected cohort of patients admitted to hospital with exacerbations of COPD.

Consecutive patients with physician diagnosed COPD exacerbation but without clinical evidence of acute cardiac disease admitted to a public hospital over a one year period were studied prospectively. NT-proBNP and troponin T were measured on admission. The primary end-point was all-cause mortality at 30 days.

Elevated NT-proBNP (>220pmol/L) was present in 65/244 patients (27.5%) and significantly predicted 30 day mortality (OR=9.0, p<0.001). Elevated troponin T (>0.03µg/L) was found in 40/241 patients (16.6%) and also predicted 30 day mortality (OR=6.3, p<0.001). These associations persisted after adjusting for other clinical and laboratory predictors of mortality (PaCO2, BMI, CURB65 score). NT-proBNP and troponin T levels appeared to have additive associations with mortality: 30 day mortality among patients with abnormalities of both NT-proBNP and troponin T was 15 fold higher than among patients with normal values.

Elevated levels of NT-proBNP and troponin T are strong predictors of early mortality among patients admitted to hospital with acute exacerbations of COPD independently of other known prognostic indicators. The pathophysiological basis for this is
unknown, but indicates that cardiac involvement in exacerbations of COPD may be an important determinant of prognosis.

**Yield of transthoracic echocardiogram (TTE) in identifying cardiac source of embolism (CSOE) in patients with ischaemic cerebrovascular accident (ICVA)**

J Mazhar¹, E Lee¹, M Davis¹

¹Department of Cardiology, Waikato Hospital and Waikato Clinical School, The University of Auckland, New Zealand

Although the yield of TTE in identifying major CSOE is low at 3%, AHA/ASA guidelines recommend TTE is reasonable when no cause for ICVA has been identified. We aimed to provide local data to test if our population might have a different risk profile.

2131 patients presented to Waikato Hospital with a CVA from 1/11/2005 to 25/11/2010, of whom 610 with an ICVA were referred for a TTE. TTE reports were reviewed for presence of major and minor CSOE.

Mean age was 68±14(SD) years and 358(58%) were male. 598(98%) suffered an ischaemic stroke and 2 % a transient ischaemic attack. TTE was performed 4 ± 5 days after the ICVA. Major CSOE were identified in 41(6.7%) patients and minor CSOE in 158(26%). Of major CSOE, 26 (4.3%) patients had left ventricular (LV) ejection fraction <35%, 12(2.0%) had mitral stenosis (MS), 2(0.33%) LV thrombus and 1 dilated cardiomyopathy (0.16%). No atrial thrombus was detected. Of minor CSOE, 60(10%) had mitral annular calcification, 60(10%) had calcific aortic stenosis, 10(1.6%) had mitral valve prolapse, 7(1.1%) suspected patent foramen ovale, 7(1.1%) LV aneurysm, 5(0.8%) atrial septal aneurysm, 2 atrial septal defect, 2 slow echo contrast, 3 aortic aneurysm, 2 aortic plaque.

In this population TTE detected major CSOE more frequently than in the international literature (6.7 vs. 3%). The frequency of MS appeared high (2.0 vs. 0.0 to 0.2%). Selection bias may partly explain the higher overall frequency of CSOE but not the disproportionately higher frequency of MS.

Conflict of interest: NIL

**Correlation between expression of Mu opioid receptor transcripts in blood and postoperative pain**

CV Mulholland¹, GM Jacobson¹, RTM Cursons¹, JW Sleigh², CJ Law²

¹Department of Biological Sciences, University of Waikato, Hamilton, New Zealand. ²Department of Anesthesiology, Waikato Clinical School, University of Auckland, Hamilton, New Zealand.

Following surgery there is great variability in the amount of pain experienced by patients.¹ Mu opioid receptors are the primary site of action of opioid analgesic drugs. The Mu opioid receptor is encoded for by the gene OPRM1 that encodes a number of
pharmacologically different Mu opioid receptor subtypes that are produced by a mechanism known as alternative splicing. Mu opioid receptor expression is not limited to the nervous system. For example the transcript variant MOR-1O has been shown to be expressed in human peripheral blood lymphocytes. The peripheral marker hypothesis proposes that neurotransmitter expression in peripheral immune cells may reflect the level of expression in the brain. To test this hypothesis we used quantitative real time PCR to measure the level of expression of the Mu opioid receptor transcript variant MOR-1O in whole blood in 50 adult patients undergoing moderately painful surgery. We correlated the level of MOR-1O expression with the severity of postoperative pain and analgesic use – measured in the post-anaesthesia care unit immediately after the surgery, and also the next day.

Expression of the Mu opioid receptor transcript MOR-1O was successfully quantified relative to the reference gene PPIB for 50 patient samples. Low MOR-1O expression was found to be associated with a higher mean pain level upon awakening, (p= 0.046) and trended towards higher total PACU and PCA morphine administration.

Fig. 1. Error bar charts showing A) VRS score upon awakening, B) Total morphine administered in PACU and C) Total self administered morphine (PCA), at low (1) and high (2) MOR-1O expression.

This research has identified a putative association between low MOR-1O expression in peripheral blood and higher pain levels following surgery.

Acknowledgements: CM was supported by a Summer Scholarship 2010-2011 from the Waikato Clinical School, Auckland University.
References:

Online access to personal health information: a pilot study in severe mental illness

DB Menkes¹-³, J Kidd¹-³, K Southey², M Orr³, J Fitzgerald³, and D Christini-Crawford⁴. ¹Waikato Clinical School, Hamilton. ²Waikato DHB, Hamilton. ³University of Auckland. ⁴The Psychology Centre, Hamilton, New Zealand

Mental health consumers often want to access their medical records, yet doing so is often challenging and frustrating. E-health has the perceived advantages of cost efficiency, improved access, and better service provision, but this is yet to be convincingly demonstrated in severe mental illness. We aimed to test how a new software (Smartmed Medifile) affects access to medical records, and perceived benefits of such access.

We recruited participants with severe and enduring mental illness through a specialist mental health pharmacy, and via a consumer-led mental health provider. Clinicians were required to confirm patients’ suitability and safety to participate. Participants completed demographic and other questionnaires and, at a subsequent visit, were interviewed and trained to use the software, with which they could view HoNOS scores, medication details, treatment plans and lab results. Kaupapa Māori research methods were used to ensure effective collection of data from Māori participants; these included a focus on individual and collective Māori identity in relation to accessing and sharing information. We also interviewed key workers and associated clinical staff regarding their experiences of and attitudes toward facilitated consumer access to medical records.

Recruitment proved difficult. After 8 months of vigorous advertisement to over 600 eligible patients, 19 consented to participate, and of these only 4 completed the protocol of 6 months access. A majority of those withdrawing did so due to worsening mental health. Software problems also caused delays and contributed to some withdrawals. Participant access to Medifile pages was generally limited, though prescription drug pages received most hits and one participant visited his medication page 24 times in one month. Qualitative data indicated that participants were interested in two key pieces of information not available in the Medifile: access to progress notes, and details about acute illness episodes involving the Mental Health Act and involuntary hospitalisation. Participants also expressed interest in a more interactive programme, including the option of direct communication with their health care team. CMHT key workers were ambivalent about the project; some declined to provide information about the study to patients, and expressed concerns about risks to patients of improved access.
Access to health information is an acknowledged priority by health planners, practitioners, and patients. Despite stated interest in access to health information, recruitment to this study was difficult, with identified obstacles at the organisational, practitioner, and consumer levels. Although the Medifile system is easy to use and visually attractive, patients with severe mental illness appear to have limited use for the system as presently configured. Despite refinements in facilitating access, mistrust of researchers and a clinician culture of protecting consumers from 'too much information' is likely to retard adoption of such technology.