

Residents' Research Day

Divisions of General Surgery, Pediatric General Surgery,
Thoracic Surgery and Vascular Surgery
Department of Surgery
University of British Columbia



April 29th, 2010

Visiting Professor: **Stephen M. Cohn MD**

Professor of Surgery and Witten B. Russ Chair
University of Texas, San Antonio



Department of Surgery
University of British Columbia

33rd ANNUAL RESIDENTS' RESEARCH DAY

April 29th, 2010

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General Surgery
Pediatric General Surgery
Thoracic Surgery
Vascular Surgery

Department of Surgery
University of British Columbia
33rd Annual Residents' Research Day
April 29th, 2010

MORNING SESSION

0800-0810 Welcome and Introduction of Judges - Dr. Morad Hameed

0810-0820 Introduction of Dr Stephen M. Cohn - Dr. Morad Hameed

General/Acute Surgery - Drs. M. Hameed/S. Bloom (Chairs)

0820-0830 Dr. Lisa Knowlton, RII Page 1
Pediatric Burns Admissions: Predictive Factors Influencing
Length of Stay, Cost and Mortality

0835-0845 Dr. Susan Krajewski, RV Page 2
Abdominal CT Scans in the Diagnosis of Acute Appendicitis: A
Decision Analysis

0850-0900 Dr. Jason Forbes, RIV Page 3
Outcomes of Intravenous Drug Users After Surgery

0905-0915 Dr. Gareth Eeson, RII Page 4/5
Practice and Outcome Variation in the Management of
Congenital Diaphragmatic Hernia – A CAPSnet Study

0920-0930 Dr. Arash Safavi Page 6
Perinatal Management of Congenital Diaphragmatic Hernia (CDH):
When and How Should Babies be Delivered?

0930-1030 **Coffee/Presentation of Research Proposals**

1030-1040 Dr. Nava Aslani, RIII Page 7
Does Mesh Offer an Advantage Over Tissue in the Open Repair
of Umbilical Hernias? A Systematic Review and Meta-Analysis

Transplant/Endocrine and Vascular Surgery - Dr. Carl Brown (Chair)

1045-1055 Dr. Clara Tan-Tam, RV Page 8
Role of Mesenchymal Stem Cells in Stabilizing Pancreatic Islet Cells
Transplant in Mice

1100-1110 Dr. May Tee, RII Page 9
Pre-Operative Localization in Primary Hyperparathyroidism

1115-1125 Dr. Amanda Johner, RII Page 10/11
Detection and Management of Hypothyroidism Following Total
or Near Total Thyroid Lobectomy: Evaluation of a Clinical Algorithm

1130-1215 Dr. Stephen Cohn, Professor of Surgery and Witten B. Russ Chair

1215-1400 **ALUMNI LUNCHEON**
Medical Student & Alumni Centre (MSAC)
2750 Heather Street

AFTERNOON SESSION

1400-1410 Dr. Clara Tan-Tam, RV Page 12/13
Cyclosporine and Tacrolimus Pharmacokinetics and Dosing
Modifications in Human Immunodeficiency Virus-Infected Liver and
Kidney Transplant Recipients

1415-1425 Dr. Julius Poon, RIII Page 14
Fate of Amputees Following Below Knee Amputation: Early and
Mid Term Results

1430-1440 Dr. Pascal Rhéaume, RVII Page 15
Risk Factors For Arteriovenous Fistula Failure After First
Radiological Salvage

General Surgical Practice – Dr. James Bond (Chair)

1445-1455 Dr. Lan Vu, RV Page 16
Medical Tourism and Bariatric Surgery: Inappropriate Management
for A Complex, Chronic Disease

1500-1515 **Coffee break**

1515-1525 Dr. Shaila Merchant, RIII Page 17
Pregnancy Among Residents Enrolled In General Surgery (Pregs):
A Survey Of Residents In A Single Canadian Training Program

1530-1540 Dr. Amanda Johner, RIII Page 18
Impact of Long Distance Endurance Training on Academic
and Clinical Productivity in a University Department of Surgery

1545-1550 Dr. Nick Fry, RIV Page 19
Examining the General Surgery Workforce in British Columbia:
Profiles and Predictions

1555-1605 Dr. Jason Faulds, RIV Page 20
The External Validity of Referral Based Data: an analysis of the Colorectal
Cancer Outcome Unit Database

1610-1625 Judging of Presentations

RESIDENTS' & ALUMNI DINNER
Shaughnessy Golf and Country Club
4300 SW Marine Drive
Reception: 1800 hrs
Dinner: 1845 hrs

PEDIATRIC BURNS ADMISSIONS: PREDICTIVE FACTORS INFLUENCING LENGTH OF STAY, COST AND MORTALITY

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³ Trauma Program Director, Pediatric Surgery, Boston Children's Hospital, Boston, Massachusetts

Background:

Burns are the most frequent cause of injury in the pediatric population among those less than 5 years old. The aim of this study is to describe the epidemiological distribution of burns related admissions in the New England area in order to determine trends in regionalization of burn care.

Methods:

Data was analyzed using the New England Pediatric Trauma Database, which includes census bureau data on all pediatric trauma admissions in New England centers between 1990-2008. Statistical analysis was performed using SAS v9.2. Univariate analysis was used to describe number of patients, gender, age, and distribution of percent burn. Multivariate linear regression was used to determine predictors of length of stay and cost. Multivariate logistic regression was employed to determine predictors of mortality. A step wise automated model (backward elimination) was used and the significance level chosen to be 0.05.

Results:

A total of 3285 patients with percent body surface area burn were analyzed, with age range of 0 to 18 years. Mortality decreased with discharge year (OR 0.746, CI 0.64,0.87), and longer length of stay (OR 0.91, CI 0.84, 0.98) and for males vs female patients (OR 0.89, CI 0.804, 0.974). It increased with % body surface area burn (OR 1.82, CI 1.54,2.17), and presence of a pediatric surgeon (OR 5.61, CI 1.47,20), and being at a trauma center (OR 4.37, CI 1.27,21). Cost increased with discharge year (\$1106.01), percent burn (\$3590.39), age (\$255.63), being at a trauma center (\$1521.21), being at a surgical training center (\$2048.44), severity of injury (\$5278.655) and each additional day of length of stay (\$1785.89) (all with $p<0.05$). Cost decreased with males vs. females (\$1516, $p<0.001$). Length of stay increased with each year of age (0.05 days, $p<0.01$), male gender (0.93 days, $p<0.001$), presence of a surgical training program (0.96, $p<0.008$), and severity of injury (0.94, $p<0.001$). It decreased in each more recent year (by 0.55 days, $p<0.001$), and the presence of a pediatric surgeon (by 0.71 days, $p<0.001$).

Conclusion:

Of the 6482 pediatric patients who were admitted for burns between 1990-2008, we see that mortality is decreasing over the years suggesting improved injury prevention measures. We see that the additional costs and length of stay incurred at trauma centers with surgical training programs likely reflect the increase severity of these burns admissions, but it may also advocate for the referral of lesser burns to community centers where they can be treated more efficiently at lower cost.

ABDOMINAL CT SCANS IN THE DIAGNOSIS OF ACUTE APPENDICITIS: A DECISION ANALYSIS.

S.A. Krajewski, C.J. Brown, and C. Hur. Department of Surgery, University of British Columbia, Vancouver, BC and the Institute for Technology Assessment, Massachusetts General Hospital, Boston, MA, USA.

The purpose of this study is to evaluate the use of abdominal CT scans in the diagnosis of appendicitis using a decision analysis model.

A decision model was developed based on a theoretical cohort of 1000 patients presenting with suspected acute appendicitis. Each risk group (low, medium and high risk for acute appendicitis) was stratified based on age and gender. Three CT imaging guidelines were defined: none, selective, and mandatory. Input variables were estimated from a pooled analysis of 70 published studies. Outcomes included negative appendectomy (NA), perforation (PR), missed appendectomy (MA), cost, and total hospital days (LOS).

In women, NA rates, costs and LOS were lowest in the mandatory CT model for all risk groups (NA=2.91% vs. 7.96% vs. 17.92%, $p<0.001$ in the medium-risk group). In men, NA rates, costs and LOS were lowest in the mandatory CT model for the low-risk group only (NA=8.26% vs. 10.71% vs. 15.97%, $p<0.001$). The PR rates and MA rates were similar in all imaging strategies (PR=19.40% vs. 19.17% vs. 19.33%, $p=0.95$). In elderly patients, there was no significant difference in the NA rates, PR rates, costs or LOS between imaging guidelines. The MA rates were significantly lower in the mandatory CT model for all risk groups (MA=5.0% vs. 7.48% vs. 13.27%, $p<0.001$).

This model supports the use of mandatory CT scan in all women with suspected appendicitis. In men, mandatory CT scans in those with low clinical probability of appendicitis is justified; when clinical suspicion is high, CT scan does not reduce the already low NA rates. Mandatory use of CT in elderly patients with atypical abdominal pain expedites the diagnosis of appendicitis and reduces MA and PR rates. Our decision model suggests that diagnostic CT scans in patients with suspected appendicitis should be based on clinical suspicion, age and gender.

OUTCOMES OF INTRAVENOUS DRUG USERS AFTER SURGERY

Forbes Jason, MD., Brown Carl, MD. SPH General Surgery

Background:

Intravenous drug users (IVDU) represent a significant proportion of patients admitted to Vancouver's St Paul's Hospital. It has been estimated that up to 14% of patients presenting to hospitals are abusers of IV drugs. Many of these patients seeking assistance will end up admitted to SPH, and a considerable proportion of these patients will go on to require a surgical procedure. Makower et al estimated that 52% of the IVDU population presenting to the emergency department will require hospitalization and a further 37% of those will require a surgical procedure. There remains a large amount of uncertainty regarding the outcomes of this surgical population. The effect of IV drug abuse is poorly understood and mandates investigation.

Methods:

A retrospective review of the St Paul's Hospital database from April 1 2006 until Feb 5 2009 identified 122 patients who were current injection drug users and HIV negative who had a non obstetrical surgical procedure. During the same time period 1290 control patients were selected. Baseline characteristics and outcomes were then compared using SPLUS software using a χ^2 analysis. Significance at a 0.05 level was determined for the outcomes of interest.

Results:

Surgical patients with a recent history of IV drug use were found to have significant different outcomes compared to control patients that do not use IV drugs. IVDU were more likely to be admitted to non surgical service relative to controls (p-value < 0.01). This is suspected to be due to the more complex nature of their illnesses, and perhaps in part to perceived difficulties in establishing a diagnosis. Those IVDU that were admitted had a significant longer length of stay (p-value < 0.01), prolonged ALC stays (p-value < 0.01) and were 21 times more likely to leave against medical advice (p-value < 0.01). They were also more likely to require multiple surgeries (p-value < 0.01) and ICU care (p-value < 0.01). The mortality of IVDU who have surgery was 3.5 times that of controls (p-value < 0.01).

Conclusion:

Injection drug use was associated with a significant increase in mortality, number of operations, length of stay, leaving against medical advice, ICU admission and ALC LOS. The reasons for this disparity among surgical patients are not clear, and future research should evaluate the reasons for this disparity.

PRACTICE AND OUTCOME VARIATION IN THE MANAGEMENT OF CONGENITAL DIAPHRAGMATIC HERNIA – A CAPSNET STUDY

Gareth Eeson MD¹, Arash Safavi MD¹, Erik Skarsgard MD¹ and the Canadian Pediatric Surgical Network

¹Division of Pediatric Surgery, BC Children's Hospital, Vancouver, BC, Canada

Background/Purpose:

Currently no consensus exists on “best practice” strategies for infants with congenital diaphragmatic hernia (CDH). As a result, care of these infants remains provider and institution-specific. Considerable variation in survival rates has been reported between individual institutions as well as between “high” and “low” volume centers (HVCs and LVCs). This study aims to describe these practice and outcome variations, ultimately to enable positive practice change through knowledge translation.

Methods:

Prospectively collected data for 215 cases of CDH from 15 institutions was abstracted from a national disease-specific database. Centers were grouped as LVCs or HVCs relative to the median case volume (n=9). Variability in practice was evaluated by individual center and by LVC vs. HVC. Categorical and continuous data were analyzed by the Chi-squared and unpaired t-test, respectively.

Results:

The study included 15 centers (mean 14.3 cases; range 2-62) of which there were 8 LVCs (mean 4.9; n=39) and 7 HVCs (mean 25.1; n=176). Groups were risk-adjusted for SNAP-II scores and birth weights.

Pre-natal: There were no differences in rates of pre-natal diagnosis (72% vs. 64%; p=0.33) or chromosomal analysis (54.8% vs. 59.3%; p=0.67) between HVC and LVC, respectively. Individual centers varied widely with respect to rates of chromosomal analysis (0-100%).

Obstetrical: Gestational age at delivery was comparable throughout (37.4 wks at LVC vs. 37.8 at HVC; p=0.55). C-section rates varied between 0-61% across centers with 27% and 33% in HVCs and LVCs, respectively (p=0.57). Nocturnal delivery was more likely at LVCs (18.8%) than HVCs (36.3%; p=0.008).

Post-natal: Ventilation strategies were similar throughout with no difference in predominant mode, pre-operative oxygenation status (mean FiO₂ 33.8 vs. 36.1; p=0.64) and pre-operative ventilation status (PCO₂ 46.7 vs. 46.2; p=0.93). Use of vasodilators varied widely between individual centers (0-67%) with 35% vs 43% of patients receiving vasodilators in LVC vs HVC (p= 0.38). Initiation of paralysis on day 1 varied markedly between 0-89% with a trend towards increased use at HVCs (48.9%) vs LVCs (35%) however this was not statistically significant (p=0.11).

Surgical: There was no difference in timing of surgery between groups (5.6 vs. 5.8 days; p=0.87). Day of surgery ranged from day of life 0-77. There was no difference in success of primary closure between LVC and HVCs (68% vs 64%; p=0.41). Usage of chest tubes at time of closure was low across centers with no difference between LVCs and HVCs (13% and 11%; p=0.75).

Outcomes: There was no difference in length of mechanical ventilation (8.2 vs. 8.9d; $p=0.72$), length of stay (30.8 vs. 34.4d; $p=0.60$), need for respiratory support at day 28 (15% vs. 16%; $p=0.87$) and need for oxygen at discharge (18% vs. 24%; $p=0.39$) between LVCs and HVCs, respectively. Rates of reflux medications at discharge (30% vs. 5%; $p=0.001$) and overall complication rates (70.4% vs. 51.3%; $p=0.02$) were higher at HVCs compared to LVCs, respectively. Overall survival rate was 81.4% with no difference between LVC (76.9%) and HVC (82.4%; $p=0.43$).

Conclusions:

This study provides population-based data on practice and outcomes in CDH in Canada. Considerable variability in the management of infants with CDH exists amongst centers. These differences point to potential areas requiring further evidence-based research as well as potential targets for improving regional delivery of care.

PERINATAL MANAGEMENT OF CONGENITAL DIAPHRAGMATIC HERNIA (CDH): WHEN AND HOW SHOULD BABIES BE DELIVERED?

Arash Safavi MD, Yi Lin PhD*, Erik D. Skarsgard MD; Canadian Pediatric Surgery Network

Department of Surgery, BC Children's Hospital and the *School for Population and Public Health, University of British Columbia, Vancouver, British Columbia, Canada

Background/Purpose:

A prenatal diagnosis of CDH enables therapeutic decision-making during the intrapartum period. This study seeks to identify the gestational age and delivery mode associated with optimal outcomes.

Patients and Methods:

A national dataset was used to study CDH babies born between 2005 and 2009. The primary outcome was survival to hospital discharge. Primary and secondary outcomes were analyzed by categorical gestational age (Preterm <37 weeks; Early term 37-38 weeks; Late term >39 weeks), by intended and actual route of delivery, and by birth plan conformity, regardless of route.

Results:

Of 214 live born babies (GA=37.6±4.0 w, BW=3064 ±696 g), 143 (66.8%) had a prenatal diagnosis and 174 (81.3%) survived to discharge. Amongst 143 prenatally diagnosed pregnancies, 122(85.3%) underwent vaginal delivery (VD) and 21(14.6%) underwent Cesarean section (CS). Conformity between intended and actual delivery occurred in 119 (83.2%). Neither categorical GA nor delivery route influenced outcome. However, babies delivered by planned CS had a lower mortality than those delivered by planned VD (2/21, 36/122 respectively; p=0.04). Conformity to any birth plan was associated with a trend towards improved survival.

Conclusion:

Our data suggests that within a national network, there may be a survival benefit to planned CS for prenatally diagnosed CDH.

Key Words:

congenital diaphragmatic hernia: perinatal diagnosis: survival: gestational age: delivery outcome

DOES MESH OFFER AN ADVANTAGE OVER TISSUE IN THE OPEN REPAIR OF UMBILICAL HERNIAS? A SYSTEMATIC REVIEW AND META-ANALYSIS

Aslani, N. BScH MD. UBC General Surgery Residency
Brown, CJ. MD MSc FRCSC. General Surgery, St. Paul's Hospital

Objective:

To determine the best surgical approach for open repair of primary umbilical hernias.

Introduction:

Primary umbilical hernias account for 10% of primary adult hernias. Conventional repairs using simple suture closure results in high recurrence rates. Mesh repairs have become standard for most other hernia repairs.

Methods:

A systematic review of all randomized trials (RCT) and observational studies published between January 1965 and October 2009 was performed. Studies were identified through searching MEDLINE, EMBASE and Cochrane database. Log odds ratios (ORs) were calculated and weighed by the Mantel-Haenszel method to obtain a pooled estimate with 95% confidence interval (CI). A fixed effects model was used.

Results:

Three RCT's and ten observational studies were identified. The pooled OR for RCT's was 0.09 in favor of mesh (95% CI 0.02-0.39). The pooled OR for observational studies was 0.40 in favor of mesh (95% CI 0.21-0.75). There was no difference in complication rates between mesh and tissue repair in RCT's or observational studies.

Conclusion:

Use of mesh in umbilical hernia repair results in decreased recurrence and similar wound complications rates compared to tissue repair for primary umbilical hernias.

ROLE OF MESENCHYMAL STEM CELLS IN STABILIZING PANCREATIC ISLET CELLS TRANSPLANT IN MICE

Clara Tan-Tam, Vinh Nguyen, Peter Stock and Qizhi Tang
Department of Surgery, University of California, San Francisco

Introduction:

The success of islet transplantation is currently impeded by early loss of the grafted islets, and later alloimmune and recurrent autoimmune-mediated rejection despite immunosuppression. Thus, islet transplantation may be improved by creating a milieu that promotes repair of islets injured during isolation, and protects islets from immune insults. Mesenchymal stem cells (MSC) have been shown to contribute to tissue repair by promoting vascularization and matrix deposition. In addition, MSCs are reported to be hypoinmunogenic and promote immune tolerance by secretion of immunomodulatory factors. In this study, we characterized MSC immunogenicity *in vivo* and their effect on syngeneic and allogeneic islet grafts.

Methods:

Bone marrow-derived MSCs were isolated and cultured in our lab, or obtained from Texas A&M. The MSCs were characterized using flow cytometry and differentiation assays. *In vivo* proliferation of TCR transgenic CD8 and CD4 T cells that were specific for BALB/c alloantigens were used to assess the immunogenicity of MSCs. Transplantation of islets into the renal capsule of streptozocin-induced diabetic mice was used to determine if MSCs could prevent early loss of syngeneic islet grafts or to prevent rejection of allogeneic islet grafts. MSCs were infused *i.v.* or co-transplanted with syngeneic or allogeneic islet grafts and the graft function was determined by following blood glucose levels.

Results:

The MSCs had the cell surface phenotype of CD45-CD34-CD105+CD73+ and variable level of CD90, which decreased with increasing passages. They were able to differentiate into adipocytes, osteoblasts, and chondrocytes *in vitro* demonstrating that they were functional MSCs. The BALB/c MSCs did not induce proliferation of CD8 T cells specific for BALB/c alloantigen H-2L^d *in vivo* in C57BL/6 mice. In contrast, the cells were able to induce a moderate proliferative response of CD4 T cells that are specific for a BALB/c allopeptide presented on C57BL/6 MHC II IA^b. Co-transplantation or *i.v.* infusion of syngeneic MSCs with or without prior exposure to IFN γ with renal capsule syngeneic islet transplants did not reduce the minimal islet mass required to normalize blood glucose, suggesting that the MSCs were unable to prevent early graft loss. In addition, allogeneic islets co-transplanted with syngeneic MSCs were rejected without a delay demonstrating that MSCs were not able to control allogeneic graft rejection in this model. Moreover, some mice developed tumors at the transplant site.

Conclusion:

MSCs were unable to trigger direct immune recognition and T cell proliferation, but they were able to induce moderate proliferation of T cells that indirectly recognized alloantigens expressed by MSCs. Syngeneic MSCs failed to protect islet grafts from early graft failure and alloimmune rejection. Our results suggest that MSCs may be heterogeneous and their immunological properties should be carefully evaluated *in vivo*.

PRE-OPERATIVE LOCALIZATION IN PRIMARY HYPERPARATHYROIDISM

Tee MC, Chan S, Nguyen V, Yang J, Holmes D, Levine D, Bugis S, Wiseman SM.

Background:

For individuals diagnosed with primary hyperparathyroidism, pre-operative imaging has become critical for surgical planning. The recent utilization of second generation hybrid Tc-99m sestamibi single photon emission computed tomography (CT/SPECT) imaging has allowed for the superimposition of functional information on highly detailed anatomical images. The objective of this study was to compare the accuracy of non-contrast CT/SPECT to planar Tc-99m sestamibi (MIBI) and neck sonography (US) for preoperative parathyroid adenoma localization in individuals diagnosed with hyperparathyroidism. Co-localization by studies in patients undergoing more than one pre-operative imaging test was also examined.

Methods:

A retrospective review of all the operations performed for primary hyperparathyroidism between January 2002 and January 2010 at a tertiary care center was carried out. There were 207 patients that made up the study cohort. Parameters such as patient demographics, imaging findings, operative findings, intra-operative PTH measurements, laboratory measurements, and pathologic diagnosis, were examined. The sensitivity and PPV of MIBI, US, and CT/SPECT were calculated. Correct localization was defined as side of localization on imaging compared to operative findings. The congruency of non-contrast CT/SPECT with other imaging modalities was also evaluated. A separate subgroup analysis was conducted for cases of ectopic and double adenomas.

Results:

The sensitivities of MIBI, US, and CT/SPECT were 0.540, 0.586, and 0.710, respectively. The positive predictive value of MIBI, US, and CT/SPECT were 0.910, 0.919, and 0.981, respectively. There was only one true negative result, and thus insufficient data to calculate test specificity and negative predictive value. There was a trend toward increased sensitivity and positive predictive value for CT/SPECT, but this result did not reach statistical significance. Co-localization was determined by a Chi-Square test. Parathyroid adenoma co-localization by US and non-contrast CT/SPECT was significantly better than US and MIBI ($p=0.03$). A subset analysis of cases of ectopic and double adenomas did not reveal any significant results.

Conclusions:

Non-contrast CT/SPECT is a more sensitive pre-operative imaging test and has a greater PPV compared to US and MIBI. Although this result was not statistically significant, it is clinically relevant as CT/SPECT allows for a more focused surgical approach in approximately 15% more patients. Furthermore, the co-localization between non-contrast CT/SPECT and US may represent the most accurate combination of pre-operative investigations for localizing parathyroid adenomas. Ongoing study is required to better elucidate the role of CT/SPECT in the preoperative evaluation of individuals diagnosed with parathyroid adenomas.

DETECTION AND MANAGEMENT OF HYPOTHYROIDISM FOLLOWING TOTAL OR NEAR TOTAL THYROID LOBECTOMY: EVALUATION OF A CLINICAL ALGORITHM

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Background:

The true incidence of hypothyroidism, and management of thyroid function, following total or near total thyroid lobectomy (TL) has received limited study. Our primary objective was to determine the incidence of post-TL permanent hypothyroidism and to determine whether asymptomatic patients with mildly elevated TSH levels can be managed conservatively. Our secondary objective was to establish whether individuals with lymphocytic infiltration of the resected thyroid gland are at increased risk for postoperative hypothyroidism.

Methods:

Subjects undergoing TL between January 2006 and January 2008 at two centers were enrolled. Pre-operative serum TSH level was measured. Thyroid function was followed prospectively based on our previously published algorithm. TSH levels were drawn at 6 weeks, 3 months, 6 months and 1 year postoperatively. At all time points subjects were evaluated for symptoms of hypothyroidism. The histology of each patient's resected gland was examined by an endocrine pathologist and the degree of lymphocytic infiltration was quantified.

Results:

The study consisted of 117 patients. Early post-operative TSH levels were significantly increased over preoperative levels ($p < 0.001$). TSH measured at 6 months to 1 year postoperatively, while still significantly increased over preoperative levels ($p < 0.001$) was also significantly reduced ($p = 0.006$) compared to the early post-operative levels. Of the patients with early hypothyroidism, 69.2% recovered to normal levels without intervention. The overall incidence of early hypothyroidism was 21.6% and permanent hypothyroidism was 7.8%. Patients with a high degree of lymphocytic infiltration had a significantly higher mean TSH level than those with a low degree of lymphocytic infiltration ($p = 0.003$).

Conclusions:

The incidence of hypothyroidism following TL is low and a significant proportion of patients who become biochemically hypothyroid will only demonstrate a transient elevation in their TSH levels. Patients with lymphocytic infiltration of the resected thyroid gland are more likely to develop post-TL hypothyroidism. If patients are followed closely with serial TSH measurement, only the minority who remain biochemically hypothyroid, or become symptomatic, need to be treated with thyroid hormone replacement.

CYCLOSPORINE AND TACROLIMUS PHARMACOKINETICS AND DOSING MODIFICATIONS IN HUMAN IMMUNODEFICIENCY VIRUS-INFECTED LIVER AND KIDNEY TRANSPLANT RECIPIENTS

Clara C. Tan-Tam^{1,6}, Lynda A. Frassetto², Burc Barin³, M. Browne³, Alan R. Wolfe³, Peter G. Stock¹, Michelle Roland⁴, and Leslie Z. Benet³.

¹Department of Surgery, ²Department of Medicine and Clinical Research Center, ³Department of Biopharmaceutical Sciences, University of California, San Francisco, CA, USA, ⁴EMMES, Bethesda, MD, ⁵California State Department of Public Health, Sacramento, CA, USA, ⁶Department of General Surgery, University of British Columbia, Vancouver, BC, Canada.

Introduction:

Inappropriate dosing of immunosuppressants may be contributing to earlier and more aggressive graft rejection among HIV-infected transplant recipients. In transplant recipients who are not infected with HIV, trough level and concentration time 2 hours after dosing (C₂) are used to monitor levels of the immunosuppressant drugs cyclosporine A and tacrolimus. However, because of deranged metabolism in HIV-infected individuals, this may not be the best method to monitor immunosuppressant levels. The goal of this study is to determine the best method for monitoring immunosuppressant levels in patients who are concomitantly taking protease inhibitors (PIs), non-nucleoside reverse-transcriptase inhibitors (NNRTIs), or both.

Methods:

We conducted a prospective study of 50 HIV-infected transplant recipients. The pharmacokinetics of the protease inhibitors and the NNRTIs were studied in combination with oral cyclosporine A (CSA) or tacrolimus (FK), before and after transplantation (weeks 2 to 4, 12, 28, 52, and 104).

Results:

In patients concomitantly taking PIs, NNRTIs or both, the CSA concentration at C₄ correlated better with the area under the curve (AUC) than did C₀ or C₂, and tacrolimus concentration at C₂ correlated better with area under the curve than did the other time points.

Table1: C_x - AUC correlations by week and drug combination for all studies.

Week	Time Point	CSA n	R ² (PI)	R ² (NNRTI)	R ² (PI-NNRTI)	FK n	R ² (PI)	R ² (NNRTI)
W2	C ₀ / C ₂	19/19/5	0.79/ 0.89	0.91 / 0.85	0.82 / 0.54*	4/4	0.97 / 0.99	0.87* / 0.84*
	C ₄	19/19/5	0.94	0.97	0.98	4/4	0.99	0.99
W12	C ₀ / C ₂	9/15/6	0.57/ 0.75	0.94 / 0.70	0.38* / 0.02*	4/4	0.22* / 0.99	0.84* / 0.40*§
	C ₄	9/15/6	0.91	0.92	0.74	4/4	0.92	0.63*
W28	C ₀ / C ₂	7/11/5	0.6 /0.45*	0.38 / 0.35*	0.95 /0.37*	2/3	N/A	1.00 / 1.00
	C ₄	7/11/5	0.87	0.49	0.92	2/3	N/A	0.99*
W52	C ₀ / C ₂	7/9/3	0.73/0. 23*	0.47 /0.85	0.94* / 0.79*	1/4	N/A	1.00 / 0.73*
	C ₄	7/9/3	0.95	0.97	0.97*	1/4	N/A	0.88

* p non-significant at 0.05 level.
§ C1 correlated the best: $R^2 = 0.91$

Conclusion:

Our results suggest trough measurements are adequate for tacrolimus monitoring, but poor predictability will occur in our patients for trough measurements with cyclosporine A.

FATE OF AMPUTEES FOLLOWING BELOW KNEE AMPUTATION: EARLY AND MID TERM RESULTS

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Purpose:

The purpose of this study was to determine the outcomes of patients undergoing below knee amputation (BKA) for gangrene or critical limb ischemia.

Methods:

A retrospective review of all patients undergoing BKA by the Vascular Surgery service of a tertiary care University-affiliated teaching hospital from Jan 1, 2006 to Dec 31, 2007 was performed. Demographic and clinical data was collected and analyzed. Up to 2-year follow up was determined by contacting patients or contacting physicians working at rehabilitation hospitals.

Results:

Over this two-year period, 60 patients underwent BKA (45 male, 15 female), with one patient having bilateral BKAs. The average age was 67 years (range 38-91). Preoperatively, 33/61 patients were not able to walk. The indication for surgery was entirely for sepsis or ischemia, (61/61, 100%). Furthermore, 36/61 (58%) of the patients had a failure of a previous revascularization or more distal amputation, and 5/61 (8%) required an amputation despite a patent bypass graft. Major co-morbidities were diabetes (49/61, 80%) and chronic renal failure (25/61, 41%). A post-op nerve sheath catheter for analgesia was used in 60/61 (98%) of patients. There were 4 perioperative deaths (6%). Seventeen (28%) wound complications occurred, of which 14 (23%) required revision. The average length of stay before transfer to a rehabilitation facility was 25.6 days. During a follow up period of two years, an additional 25 patients (42%) died. Twelve patients were lost to follow up. The average time to final prosthesis was 4.8 months. At one year post BKA, 33/35 (94%) patients who were alive, were walking with their prosthesis, and 2/61 (3%) could not walk because of either a poor fitting prosthesis or poor wound healing.

Conclusion:

When BKA is required for sepsis or ischemia; the vast majority of patients can expect to survive the procedure. However, amputation revision is commonly needed. The two-year survival is poor. However, for patients who tolerate amputation and survive at least two years, ambulation with a walking prosthesis was seen in the vast majority.

RISK FACTORS FOR ARTERIOVENOUS FISTULA FAILURE AFTER FIRST RADIOLOGICAL SALVAGE

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Background:

The greatest barrier to repetitive hemodialysis is the limited long-term patency of autogenous fistulas. Percutaneous transluminal angioplasty (PTA) has slowly replaced surgical procedures to salvage malfunctioning native accesses. The aim of this study is to assess patency after percutaneous treatment of dysfunctional first native arteriovenous fistulas and to examine factors predictive of failure.

Methods:

We performed a retrospective analysis of prospectively collected data from January 2005 to 2008. Baseline demographic data and data pertaining to the fistula creation, use, interventions and failure were extracted. Post-intervention patency, defined as the interval from first intervention to reintervention designed to maintain or re-established patency, was examined as a function of anatomic and clinical variables with use of Cox hazards models and the Kaplan-Meier method.

Results:

393 arteriovenous fistula were created at St.Pauls Hospital between January 1, 2005 and January 31, 2008 of which 161 required at a first angioplasty. Initial technical success rate was 81% and the complications occurred in 6 %. Overall, post-intervention primary patencies at 1, 2, 3years were 31%, 21% and 21%, and post-intervention secondary patencies were 76%, 66% and 64% respectively. On multivariate analysis, the following remained independent predictors of early PTA failure: outflow vein lesion, multiple stenosis and stenosis greater than 2 cm. Technical success, AVF used before angioplasty and Glomerulonephritis & Vasculitis as primary cause of chronic renal failure all affected positively post-intervention secondary patency.

Conclusion:

Percutaneous transluminal angioplasty of failing native arteriovenous fistulas is a technically effective and safe procedure. Despite modest post-intervention primary patency rates in our experience, high post-intervention secondary patency rates can be achieved with percutaneous intervention. These findings emphasize the need for close surveillance of native fistulas and a low threshold for diagnostic fistulography after initial intervention.

MEDICAL TOURISM AND BARIATRIC SURGERY: INAPPROPRIATE MANAGEMENT FOR A COMPLEX, CHRONIC DISEASE

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Abstract:

Background:

The number of Canadians who self-refer for Bariatric Surgery outside of Canada or to private clinics within Canada remains undefined. Given the complexity of morbid obesity, the recommended requirement for fairly intense pre-operative multidisciplinary assessment, careful patient and procedure selection and long term follow-up, it should come as no surprise that existing Canadian Bariatric Centres are receiving mounting referrals for consultation and management of patients who have had Bariatric Surgery by a process that could be reasonably considered as medical tourism. The outcomes from this questionable practice have not been systematically evaluated to date.

Methods:

We completed a chart review of known cases referred to our centre for complications related to medical tourism and Bariatric Surgery.

Results:

In this report, we present a series of patients who have experienced complications as a result of medical tourism for Bariatric Surgery and required both urgent and non-urgent surgical management at a tertiary care center within Canada. Complications have resulted from three commonly used procedures: adjustable gastric banding, gastric sleeve resection, and Roux-en-Y gastric bypass.

Conclusion:

We propose that a medical tourism approach to the surgical management of obesity – a chronic disease – is inappropriate and raises clear ethical and moral issues and these will be highlighted by our case presentations. These patients have drawn resources away from a Bariatric Centre dedicated to the care of obesity using a chronic care management model. The complexity of these complications demonstrates the importance of continuity of care for patients who have undergone Bariatric Surgery.

PREGNANCY AMONG RESIDENTS ENROLLED IN GENERAL SURGERY (PREGS): A SURVEY OF RESIDENTS IN A SINGLE CANADIAN TRAINING PROGRAM

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Background:

We explored attitudes and experiences of general surgery residents at the University of British Columbia (UBC) regarding issues related to pregnancy during residency.

Methods:

All residents (n = 81) enrolled in the UBC General Surgery Residency Program from 1997 to 2009 were surveyed using an anonymous web-based survey tool.

Results:

Our response rate was 65% (53/81). There were fewer pregnancies among female residents compared to partners of male residents (9/25 vs. 22/28, $p = 0.002$). Both female residents and partners of male residents experienced pregnancy-related complications (2/9 v. 3/22, $p =$ not significant). All (6/6) female residents who reported a pregnancy breastfed for ≥ 6 months; however 67% (4/6) felt their role as a surgical resident prevented them from breastfeeding as long as they would have liked. The majority (5/6, 83%) pursued a graduate degree and/or research during maternity leave. Over 50% (23/45) of respondents reported an increased workload because of a colleague's pregnancy. Many (36/53, 68%) were unaware of the presence or absence of a maternity/parenting policy specific to the general surgery program and most were in favor of instituting such a policy.

Conclusion:

General surgery resident mothers do not breastfeed for the duration they desire; factors precluding this must be explored. Contingency plans should be in place when pregnant residents cannot perform their clinical duties so their colleagues are not overburdened. General surgery programs should have a formal policy that addresses these unique issues.

IMPACT OF LONG DISTANCE ENDURANCE TRAINING ON ACADEMIC AND CLINICAL PRODUCTIVITY IN A UNIVERSITY DEPARTMENT OF SURGERY

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Background:

The lifestyle and pressures of an academic surgeon may exacerbate general environmental forces that predispose to an overweight population. Nevertheless, surgeons are obliged to take leadership roles in this health related issue. Our objective was to determine if it is feasible for surgeons to undertake high-volume endurance training while maintaining the academic and clinical productivity required in a University teaching centre.

Methods:

An 18 month (January 2008 - July 2009) retrospective analysis of 14 Vancouver General Hospital (VGH) general / vascular surgeons' clinical and academic output was reviewed. The cadre was separated into two groups by longest distance of endurance event undertaken, with 10 km as the deciding distance. Clinical output was assessed by operations performed, hours of operation undertaken and on-call duties. Data was obtained from the VGH and UBCH ORMIS database and the VCH on-call scheduler. Academic output was assessed by teaching hours, research grants and publications, which were obtained from the Department of Surgery and UBC Faculty of Medicine databases as well as electronic indexes. Personal training logs and race entries of the "endurance" surgeons were analyzed.

Results:

Activity level of the "endurance" surgeons was confirmed. The minimum average weekly hours of training was 5.74 hours and the maximum was 13.71 hours, with each of the surgeons competing in at least a triathlon distance event. The "endurance" surgeons had a statistically higher number of call shifts ($p < 0.05$) than the comparison group. Although the comparator group performed significantly more scheduled operations ($p < 0.05$), the "endurance" group undertook more unscheduled operations and had comparable overall hours of operation. There was no significant difference between the groups in the number of teaching hours, publications or research grants.

Conclusions:

It is feasible to maintain the academic and clinical standards of a university teaching hospital while undertaking long-distance endurance training. Careful integration early into residency training may lead to a healthier cohort of surgeons that is sustainable through their career.

EXAMINING THE GENERAL SURGERY WORKFORCE IN BRITISH COLUMBIA: PROFILES AND PREDICTIONS

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Background:

As the population of B.C. continues to age, the demands on general surgery services are expected to increase. The question of whether B.C. has sufficient general surgeons to meet the needs of the population is therefore a prescient one. In this study we describe the current and projected general surgery workforce to inform training and recruitment efforts.

General Surgery workforce assessments are notoriously difficult due to the breadth of the field and trends towards sub-specialization. The surgical workforce is aging, and as surgeons retire, their replacements may not take on an equivalent workload. From a training perspective, the number of applications to general surgery programs is trending down. Training surgeons is a long and expensive process and B.C. can ill afford to train an excess of surgeons who will never cut skin in this province.

Methods:

An accurate snapshot of the current general surgery workforce allows us to determine how well prepared the discipline is to meet current and future needs. Through survey responses and a review of provincial billing data we quantify the number of active general surgeons along with their relative contributions expressed as job equivalents. Current general surgery trainees have been surveyed throughout their residency to characterize their attitudes and expectations towards future workload. This allows us to examine the number of job equivalents required to meet the demand for general surgical procedures in B.C. and the number of job equivalents available to meet that need, both now and in the future.

Results:

By combining population data with accurate practice and demographic profiles we are able predict the general surgery workforce requirement - and the number of new trainees required to meet that demand - with a much greater degree of accuracy and rigor than was possible in the past.

THE EXTERNAL VALIDITY OF REFERRAL BASED DATA: AN ANALYSIS OF THE COLORECTAL CANCER OUTCOME UNIT DATABASE

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Background:

Within the province of British Columbia, the BC Cancer Registry collects and maintains data on all patients diagnosed with cancer in the province. Information available from the registry includes demographic, diagnostic and mortality data. The use of Cancer Registry data for population based research is limited by the fact that stage specific information is not collected. To address this issue, the Colorectal Cancer Outcomes Unit (CRCOU) was established to collect detailed information on all patients with colorectal cancer referred to the British Columbia Cancer Agency (BCCA). The ability to generalize conclusions based on this data to the entire population of patients with colorectal cancer has not been assessed. The goal of the study was to determine if patients included in the CRCOU database are representative of the population of patients with colorectal cancer in the province. We hypothesize that systematic differences exist between patients captured within the CRCOU database and those who are not.

Methods:

The British Columbia Cancer Registry was queried to identify all patients with colorectal cancer in British Columbia between 2002-2004. The CRCOU database was searched to identify all patients who had been referred to the BCCA over the same period. A comparison between these databases identified a cohort of patients included in the CRCOU database and a cohort who were not. Demographic information including patient age, gender, and Health Authority of origin was collected for patients in each cohort. Logistic regression analysis was used to compare patients in the CRCOU database to non-referred colorectal cancer patients.

Results:

A total of 6749 patients were included in the analysis; 3651 were included in the CRCOU database and 3098 patients were not. Patient age at diagnosis and health care region were identified as significant differences between cohorts ($p < 0.0001$). Gender was not found to vary significantly between the two cohorts.

Conclusion:

The CRCOU database is a useful research tool for patients with colorectal cancer who are referred to the BCCA. Significant differences related to patient age at diagnosis and location within the province limit the ability to generalize conclusions based on CRCOU data to patients in the province as a whole. Expansion of the BC Cancer registry to include stage specific information may improve the quality of population based research for patients with colorectal cancer in the province.

POSTER PRESENTATIONS

Access to Surgical Care in Uganda - Barriers to effective treatment of pediatric inguinal hernia - Gareth Eeson

Adhesive Small Bowel Obstruction in Children - Should We Still Operate? - Gareth Eeson

Predictors of Outcome Following Pancreaticoduodenectomy - Gareth Eeson

Follow-up of patients with stage II and stage III colorectal cancer in British Columbia after curative resection - Magda Recsky

Complications in acute care surgery: A prospective cohort study - Cailan MacPherson

Acute Surgery 2.0: Moving towards a clinically integrated Acute Care Surgery registry - Dan Jenkin

Reporting of malignant polyps - Court Babcock

Title: Outcomes of Fetal Intra-Abdominal Calcifications identified on Prenatal Ultrasound Supervised by Dr. E. Skarsgard and Dr. C. Mayer (Obs/Gyn) – Siham Zerhouni

Autocrine motility factor receptor expression in colorectal cancer – Yasmin Halwani

Cost Effectiveness of Bariatric Surgery: Implications for the development of a multidisciplinary bariatric surgery program in British Columbia - May Tee

Pathologic Synoptic Reporting For Thyroid Cancer Study – Elaine Lam

The road traffic injury report card: a survey of incidence rates in communities across Canada – Sarah Lord

Malignant Melanoma in B.C. - A Review of Standards of Care – Deb Davis