

TRANSPLANTATION SURGERY

TN01

HILAR CHOLANGIOCARCINOMA: RADIOLOGICAL DIAGNOSIS, STAGING AND PRE-OPERATIVE INTERVENTION

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Hilar intrahepatic cholangiocarcinoma (I-CAC) accounts for 25% of CAC. Complete surgical resection offers the best possibility of cure but this demands accurate pre-operative assessment and staging as well as appropriate ancillary procedures such as selective portal vein embolisation and targeted biliary drainage.

CT (MD-CT) and MRI are the primary imaging modalities used for the assessment of hilar I-CAC but despite advances in imaging technology, overall accuracy for assessing resectability of hilar I-CAC is approximately 60–75% for modalities. Hilar I-CAC may present as thickening of the biliary wall with infiltrative margins or (less commonly) a polypoid intra-ductal or exophytic mass. The mass typically demonstrates delayed enhancement after contrast as a result of the sclerosis and fibrosis of surrounding tissues frequently seen in CAC. The extent of intraductal tumour spread is more accurately demonstrated with MRI/MRCP but the high spatial resolution of MD-CT allows possibly more accurate definition of vascular invasion and small lymph metastases. These structures may also be evaluated with pre-operative laparoscopy. CAC is FDG avid and CT-PET has a role in detecting nodal and peritoneal metastases.

Selective pre-operative percutaneous transhepatic biliary drainage (PTBD) of the obstructed hepatic segments in the future hepatic remnant has been shown to improve post-operative outcomes. Pre-operative selective portal vein embolisation has been used to promote hypertrophy in patients with marginal remnant volumes. The degree of compensatory hypertrophy is an important predictor of outcome and is dependant on technical procedural success and underlying liver disease.

TN02

RADIOLOGICAL ASSESSMENT OF LIVE LIVER AND KIDNEY DONORS

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Technical success with minimal morbidity for both donor and recipient in live hepatic and renal donor surgery can be achieved by accurate pre-operative assessment, including high quality imaging of donor hepatic and renal anatomy. Invasive imaging modalities such as angiography and ERCP have been replaced by the non-invasive imaging modalities multidetector CT (MD-CT) and MRI.

The aims of pre-operative imaging of potential hepatic donors include the assessment of hepatic vascular anatomy, biliary anatomy, diffuse hepatic parenchymal conditions such as steatosis, focal hepatic lesions and liver volumetry. There are constant improvements in both CT and MR technology and the local choice of modality may be influenced by availability and local expertise. Both MD-CT and MRI can be used to assess hepatic arterial, portal venous and hepatic venous anatomy as well as liver volumetry. The temporal and spatial resolution of MD-CT possibly allows more accurate assessment of hepatic arterial anatomy.

Biliary anatomy requires accurate assessment as biliary complications are the most common cause of post operative morbidity. MRCP techniques, particularly recent 3-dimensional free breathing techniques and MD-CT with either oral or intravenous cholangiographic agents (CTCP) can provide high resolution cholangiographic imaging. Hepatic steatosis involving the donor is qualitatively assessed with chemical shift MR producing most sensitive assessment.

MD-CT is frequently used in the assessment of potential renal donors with arterial, venous and collecting system variants relatively common. Early main renal artery branching, capsular arteries and large systemic venous tributaries all require recognition.

TN03

BILIARY STENTING IS ASSOCIATED WITH A REDUCED RISK OF BILIARY ANASTOMOTIC STRICTURE FOLLOWING LIVER TRANSPLANTATION

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Aim Biliary complications are a common cause of morbidity following liver transplantation (LT). The risk factors for biliary anastomotic stricture (BAS) are poorly understood. We analysed the risk factors for BAS.

Methods A retrospective review of a prospective database of patients who underwent LT between 1988 and 2006 in the Liver Transplant Unit Victoria was undertaken. Forty-five of 502 (9%) LT carried out during this period were complicated by BAS. These cases were compared with 45 controls who underwent LT immediately preceding the cases. Donor, donor operation, recipient, recipient operation and donor/recipient compatibility factors were assessed. Non-parametric data analysis was used.

Results Cases were less likely to have had a biliary stent placed at LT than controls (74% vs 91%, respectively, $P = 0.037$). The BAS rate in patients who had a stent at LT was 7.3% compared with 25.5% for those who did not ($P < 0.001$). There was no difference in BAS rate with differences in stent type (infant feeding catheter vs T tube) or size. Although there were statistically significant differences between cases and controls for donor potassium (3.9 ± 0.8 vs 4.0 ± 0.4 mmol/L, respectively, $P = 0.032$) and HCO₃ (25 ± 3 vs 23 ± 3 mmol/L, respectively, $P = 0.021$), the clinical significance of these differences is questionable.

Conclusions The rate of BAS following LT is higher in patients who did not have a biliary stent placed at the time of LT, though a causative link has not been established.

TN04

BIOELECTRICAL IMPEDANCE PHASE ANGLE IN CHRONIC LIVER DISEASE AND LIVER TRANSPLANTATION

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Introduction Phase Angle (PA), determined using bioelectrical impedance, may be altered in chronic liver disease. We aimed to determine whether 1. PA predicts survival in cirrhotic patients and 2. PA improves after nutritional support and transplantation.

Methods Data were extracted from a prospective database of 252 cirrhotic patients referred for nutritional assessment and intervention (HCC excluded). Median age was 49 (16–73), 68% male. Aetiology was viral (55%), ALD (15%), cholestatic (11%), and other (19%), with median MELD 11 (6–36). Measurements included PA and total body protein (TBP). Patients were followed for a median 53 (4–93) months. Survival and logistic regression analysis were performed.

Results 138 (55%) died or were transplanted during follow-up. Low PA (<4.4%) was associated with worse survival (median 16 vs. 57 months, $P = 0.02$) independent of the MELD score (HR for MELD 1.18; 95% CI 1.05–1.32, $P < 0.0001$ and for PA 0.56; 95% CI 0.32–0.98, $P = 0.046$). In 93 patients followed for 100 days after nutritional intervention, TBP increased by 200g ($P = 0.04$) and PA increased from 4.8% to 5.2% ($P = 0.0006$). PA also increased from low to normal levels one year post-OLT (4.9% to 5.7%, $P = 0.0001$, $n = 69$).

Conclusion Low PA correlates with reduced TBP and a higher risk progression to transplantation or death. PA improves after nutritional support and transplantation.

TN05

NATURAL HISTORY OF TRANSPLANT RENAL ARTERY STENOSIS

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Introduction Integrity of Transplant Renal Artery is crucial for long term survival of the graft. Literature regarding the evolution of Transplant Renal Artery Stenosis (TRAS) is scant.

Method Retrospective analysis of 1042 duplex scans in kidney transplant recipients. Duplex scan (GE VIVID 307, multiphase transducer) was used as routine screening modality. Time period 1999–2006. Total no of patients – 148. Mean age 47.4 yrs. M : F: 83 : 65. Average follow up –2.45 yrs. Renal arterial ratio and peak systolic velocities were used as absolute criteria for diagnosis. Relative criteria used were parenchymal perfusion, size of kidney, resistive indices and presence of other vascular conditions.

Results Number of patients detected to have TRAS-50. Mean age-48.36 yrs. M : F: 29 : 21. Average time period for detection of stenosis – 193 days. 20 patients had ostial stenosis, 23 – mid segment, 1 at hilum, 2 – branch and 4 – throughout length of artery. Two groups: Early stenosis i.e. within 3 mo – 36(72%) patients. Late stenosis – 14 (28%) patients. Average time to detect early stenosis 74 (10–100) days and late stenosis 502 (140–1396) days. 21/36 patients in group 1 showed complete resolution of stenosis in an average time of 270 days whereas only 3/14 patients in the late group resolved at an average period of 375 days ($p = 0.019$).

Conclusion Routine duplex scans can detect significant numbers of TRAS. Stenosis occurring early post transplant are more likely to resolve than late occurring stenosis. Prospective controlled studies are needed to resolve the issue.

TN06 BONE BANKING

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This paper presents an audit of 22 years of bone banking at Royal Prince Alfred Hospital, along with a review of the current literature regarding the use of allograft bone.

Comparisons both locally and internationally are made, and we are confident that standards in Australia are equivalent to those internationally. The requirement for bone graft material in Australia is likely to rise, as more reconstructive and revision surgery is undertaken, along with increases in primary arthroplasty procedures.

TN07 UW OR HTK – WHICH IS BETTER IN LIVER TRANSPLANTATION?

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Orthotopic liver transplant [OLT] is the gold standard treatment for end stage liver disease [ESLD]. University of Wisconsin [UW] is accepted as the gold standard preserving solution for liver graft preservation. UW is an intracellular type of solution. Histidine-tryptophan-ketoglutarate [HTK] is an extra cellular type of solution that offers several advantages. UW and HTK have been used with equal efficacy in preserving abdominal and thoracic cadaveric organs harvested for transplantation. Some transplant centers over the world have changed their practice to use HTK solution as a primary solution for liver transplantation (cadaveric and living related donor).

Aim

- (1) To review the current world literature comparing both the solutions.
- (2) To review the studies including cadaveric and living donor liver transplantation.

Methods

- (1) At National University Hospital, we use UW solution for all our liver transplants.
- (2) Extensive review of the literature using the pubmed, Ovid, MD consult, Proquest and Netlibrary was done.
- (3) All the human studies comparing the use of UW and HTK for liver transplantation have been reviewed.

Conclusion

- (1) Both the solutions have been safely used in cadaveric and living related donor liver transplantation.
- (2) UW and HKT are equally effective when cold ischaemia times [CIT] are not prolonged.
- (3) HTK offers the cost benefits even if high volumes are used.
- (4) There are other practical benefits of using HTK.
- (5) The efficacy of both the solutions with prolonged CIT and using marginal livers has to be assessed and compared.

TN08 THE EARLY EXPERIENCE OF ABO-INCOMPATIBLE RENAL TRANSPLANTATION IN AUSTRALIA

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Purpose In the presence of static cadaveric donation rates, renal transplantation relies increasingly on living donors. ABO blood group incompatibility has traditionally prevented many potential living donors from donating because risk of hyperacute rejection/antibody-mediated rejection (AbMR) with graft loss, with or without need for concurrent splenectomy and intense immunosuppression. Pre- and post-transplant antibody removal and monitoring anti-blood group antibody levels have allowed this to become a clinical possibility. We report results on the first ten ABO incompatible kidney transplants performed in Australia at The Royal Melbourne and Melbourne Private Hospitals, without splenectomy.

Method All patients underwent transplantation after two weeks of Mycophenolate Mofetil, and antibody removal (plasma exchanges or Glycosorb columns). Three patients received Rituximab pre-transplant. Standard immunosuppression was commenced at transplantation. All patients, except one low-titre A2/O patient, received post transplant antibody removal. None underwent splenectomy.

Results Thirty day mortality was zero, and at median six-month follow-up, there have been no episodes of rejection or opportunistic infections. All transplants are currently functioning. Two patients developed urosepsis, one post-transplant diabetes. Two patients required reoperation and ureteric reimplantation for ureteric leakage.

Conclusion ABO incompatible transplantation can be performed without excessive immunosuppression and with low morbidity. Preservation of the spleen reduces operative risk, post-operative complications and the added vulnerability to infection.

TN09 HEPATIC EPITHELOID HAEMANGIOENDOTHELIOMA: TWO CONTRASTING CASES

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Epitheloid Haemangioendothelioma of the liver is a rare mesenchymal tumour the recommended treatment of which is either liver resection or hepatic transplantation, if diffuse without metastases. The Australian National Liver Transplant Unit, Sydney has assessed and treated 2 patients with this tumour found to be limited to the liver after extensive investigation.

The first case was a 43-year-old woman at the time of her operation in 1990. She underwent liver transplantation for a solitary biopsy proven right anterior hepatic lobe haemangioendothelioma. She has been routinely followed up for 16 years and remains recurrence free at last review.

The second case was operated upon in 2004. This 59 years old woman present with an incidental radiological finding of multiple biopsy proven Epitheloid Haemangioendothelioma, limited to the right hepatic lobe and anatomically considered resectable. A right hemi-hepatectomy was performed, however an addition wedge resection of a non-radiologically recognised deposit in segment III was required. Resection was planned on the basis that no evidence of liver function impairment was evident and so an extended period on the transplantation waiting list might be anticipated. It was also believed that resection would not preclude latter listing for transplantation. Suitability of the tumour for this approach was suggested by low tumour activity on PET scan. This patient has been regularly reviewed for over 3 years with no evidence of recurrence.

We will review our experience of this neoplasm in relation to the literature surrounding its management in the liver.

TN10
MOVING FROM TISSUE TRANSPLANTATION TO TISSUE
ENGINEERING – IMMUNOLOGIC SURVEY OF
A PROSPECTIVE SCAFFOLD

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Purpose To highlight the design process for tissue engineered mucosa and evaluate the results of an in – vivo immunologic survey done in an animal model.

Methods 21 Sprague Dawley rats were divided into three groups to study the systemic immune response to our developed biomaterial, with two other materials used for comparison. Serial subcutaneous implantation was done to serve as antigenic booster. The animals were sacrificed after a 31 day period and their spleens were harvested, digested to make single cell suspensions and used flow cytometry to quantitate CD4+ and CD8+ cells. The CD8+ cells counts are a reflection of the immuno-toxicity of the material.

Results CD 4+ and CD8+ counts were expressed as a percentage of total cells. The mean and standard deviation of CD8+ counts of our potential scaffold material was 19.782 ± 4.021 as compared to Duragen which was 21.574 ± 3.837 and the group with porcine skin 19.598 ± 3.678 .

Conclusions Striving towards the goal of creating a bioengineered mucosa requires an optimal scaffold with proven immunologic safety. We have attempted to study the systemic immunologic response by comparing our biomaterial with existing materials that are already in clinical use. Though absolute values of CD8+ are comparable and within the same range, larger trials will be needed to establish significant benefits of one over the other.

TN11
RENAL ALLOGRAFT COMPRESSION SYNDROME:
A REAL ENTITY

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Renal allograft compression syndrome (RACS) is being increasingly recognised as cause of early allograft dysfunction.

Aim To assess the validity of RACS.

Methods Clinical and laboratory findings used to diagnose RACS included acute allograft dysfunction (+ oliguria), duplex ultrasound demonstrating diminished, or reversed diastolic flow within interlobar and segmental arteries and, biopsy showing absence of acute rejection or toxicity. Final diagnosis was made at urgent laparotomy. Observations of poor allograft colour and perfusion after reopening the retroperitoneum were considered confirmatory for RACS.

Results Series includes 2 males and 1 female patients. Time elapsed between transplantation and RACS diagnosis was 24–48 hrs. After surgical decompression the allograft perfusion improved visibly in two patients and these cases were then closed with PTFE mesh hood closure. There was no significant improvement observed in the third case that had a renal vein thrombus, which ultimately led to the demise of the graft. Beneficial clinical results were obtained in two cases documented by a sustained decrease in creatinine. Average follow-up was 9.5 months without any allograft dysfunction.

Conclusions RACS is a real entity with a potential to cause graft loss. Kidney can be salvaged by urgent surgical decompression and PTFE mesh closure.