Living Donor Kidney Transplantation
The Donor & The Recipient

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The Department of Medicine,
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Guy’s Hospital
1721 - 1725
“The Hospital for the Incurables”
Living Donor Kidney Transplantation

The Donor & The Recipient

- Kidney Transplantation
  - History, UK perspective & Guy’s Hospital perspective
- Recipient Medical Aspects
- Surgical Aspects of Kidney Transplant
- Living Donation
  - Donor Medical & Psychological Aspects
  - Surgical Aspects of Donor Nephrectomy
- Questions
Renal Function

• eGFR - (e)stimate:
  – serum creatinine, age, sex & race
  – abbreviated (4 point) MDRD equation
    • not validated for children or in pregnancy
    • significant errors at extremes of body type
      – e.g. malnourished, amputees, body builders
    • racial differences- 20% higher in Afro-Caribbean black patients

• Formal GFR
  – EDTA or DTPA – GFR
Chronic Kidney Disease (CKD) stages

<table>
<thead>
<tr>
<th>Stage</th>
<th>eGFR</th>
<th>Description</th>
<th>Monitoring</th>
<th>Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>90+</td>
<td>Normal function but evidence of structural abnormalities</td>
<td>Annual</td>
<td>BP control, ACE if proteinuric</td>
</tr>
<tr>
<td>2</td>
<td>60-89</td>
<td>Mildly reduced kidney function</td>
<td>Annual</td>
<td>BP control, ACE if proteinuric</td>
</tr>
<tr>
<td>3a</td>
<td>45-59</td>
<td>Moderately reduced kidney function</td>
<td>6 monthly/Annual</td>
<td>BP control, ACE if proteinuric, CVS risk management</td>
</tr>
<tr>
<td>3b</td>
<td>30-44</td>
<td>Moderately reduced kidney function</td>
<td>6 monthly</td>
<td>BP control, ACE if proteinuric, CV risk management</td>
</tr>
<tr>
<td>4</td>
<td>15-29</td>
<td>Severely reduced kidney function</td>
<td>3-4 monthly</td>
<td>Prepare for Dialysis, Transplantation, Anaemia, CKD-MBD and CV risk management</td>
</tr>
<tr>
<td>5</td>
<td>&lt;15 or on dialysis</td>
<td>Very severely reduced kidney function (end stage kidney disease)</td>
<td>Frequently</td>
<td>Dialysis, Transplantation, Anaemia, CKD-MBD and CV risk management</td>
</tr>
</tbody>
</table>

Suffixes:
P= significant proteinuria
T= transplanted
D= on dialysis
Causes ESRD

### Primary Causes of Kidney Failure (2005)

- **Diabetes:** 43.8%
- **High blood pressure:** 26.8%
- **Other:** 17.5%
- **Glomerulonephritis:** 7.6%
- **Cystic disease:** 2.3%
- **Urologic diseases:** 2.0%

### Underlying Aetiology

<table>
<thead>
<tr>
<th>Aetiology</th>
<th>Number of Children</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Posterior urethral valves (PUV)</td>
<td>40</td>
<td>53.3</td>
</tr>
<tr>
<td>Dysplastic kidneys</td>
<td>15</td>
<td>20</td>
</tr>
<tr>
<td>Prune belly syndrome</td>
<td>6</td>
<td>8</td>
</tr>
<tr>
<td>Neuropathic bladder</td>
<td>4</td>
<td>5.3</td>
</tr>
<tr>
<td>Idiopathic</td>
<td>2</td>
<td>2.7</td>
</tr>
<tr>
<td>Other</td>
<td>8</td>
<td>10.7</td>
</tr>
</tbody>
</table>

**VACTERL** association, horseshoe kidney, duplex system, vesico-ureteral reflux (VUR) and cloacal anomaly.
History

- 1902 Ullman
  Carotid

- 1906 Carrel & Guthrie

- 1906 Jaboulay
  Brachial / Femoral

The Transplantation of Organs
NY Med J 1914
History

• 1933 - Voronoy
  • Human-femoral

• 1951 - Kuss
  • Human-abdominal
December 23rd 1954: Dr Joseph Murray
1st successful kidney transplant
Identical twins - Ronald & Richard Herrick
Brigham & Women's Hospital – Boston, USA
1957-61 6-MP & azathioprine synthesised (Elion & Hitchings). Worked in dogs (Calne) but initial results awful in humans.

1963: Starzl azathioprine + steroids

1970 Cyclosporine isolated from fungus *Tolypocladium inflatum* Sandoz (Basel).
1976 J. F. Borel discovered its immunosuppressive activity
1978 R Calne – 1st Human transplant use

Where do kidney donors come from?

**Living donors**
- related/unrelated
- paired exchange scheme
- altruistic
- ABO incompatible

**Non heart-beating donors**
- donation after cardiac death (DCD)

**Heart-beating donors**
- donation after brain-stem death (DBD)
Transplantation adds years

Risk of Death

Dialysis

Transplant

Transplantation is economical

<table>
<thead>
<tr>
<th></th>
<th>Cost/yr</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transplant</td>
<td>£20000</td>
</tr>
<tr>
<td>Dialysis</td>
<td>£20000</td>
</tr>
</tbody>
</table>

Break even at 3 years post transplantation.
Human Leucocyte Antigen = Major Histocompatibility Complex

A **self marker** (MHC) labels the body’s cells as a ‘friend’ and are tolerated by the immune system.

An **antigen** is a molecule that the immune system recognises as foreign (non-self) and treats as a ‘foe’.
The Clinical Conundrum

Immunosuppression

Under

Acute rejection
Chronic rejection

NODAT - Diabetes
Nephrotoxic

Over

Infection-CMV, BK, UTI
Malignancy-PTLD, Skin
Population
66 million

2018-2019

3594 Kidneys
Transplanted

UK Transplant

- Adult Kidney Centres = 23
- Kidney & Pancreas Centres = 8
- Paediatric Kidney Centres = 9
- Transplant Urology at 6 centres
UK Deceased donor kidney programme, 1 April 1998 - 31 March 2008
Number of donors, transplants & patients on active transplant list

Year                  | Donors | Transplants | Transplant list
1998-1999             | 711    | 1339        | 1393
1999-2000             | 741    | 1393        | 1399
2000-2001             | 731    | 1359        | 1388
2001-2002             | 705    | 1313        | 1308
2002-2003             | 743    | 1399        | 1326
2003-2004             | 734    | 1388        | 1326
2004-2005             | 712    | 1308        | 1388
2005-2006             | 722    | 1326        | 1440
2006-2007             | 765    | 1440        | 1453
2007-2008             | 789    | 1453        | 6980

Number of donors, transplants & patients on active transplant list.
Figure 5.1  Deceased donor kidney programme in the UK, 1 April 2007 - 31 March 2017, Number of donors, transplants and patients on the active transplant list at 31 March

- Donors
- Transplants
- Transplant list

Number

Year


789  1453  1570  1657  1667  1792  1930  2141  2069  2227  2338

859  931  957  1031  1148  1243  1204  1293  1336
Figure 5.1  Deceased donor kidney programme in the UK, 1 April 2009 - 31 March 2019, Number of donors, transplants and patients on the active transplant list at 31 March
<table>
<thead>
<tr>
<th></th>
<th>Functioning transplants¹</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kidney</td>
<td>39700</td>
</tr>
<tr>
<td>Pancreas</td>
<td>2000</td>
</tr>
<tr>
<td>Cardiothoracic</td>
<td>4000</td>
</tr>
<tr>
<td>Liver</td>
<td>10500</td>
</tr>
<tr>
<td>Intestinal</td>
<td>100</td>
</tr>
<tr>
<td><strong>ALL PATIENTS</strong></td>
<td><strong>54500</strong></td>
</tr>
</tbody>
</table>

¹ Approximate number of patients with a functioning transplant being followed up.
Multi-organ transplants (excluding intestinal transplants) are counted in each organ.
Excludes those patients known to be lost to follow-up.
Outcomes

Table 11.5  **Graft survival after first adult living donor kidney transplant**

<table>
<thead>
<tr>
<th>Year of transplant</th>
<th>No. at risk on day 0</th>
<th>One year % (95% confidence interval)</th>
<th>Two year % (95% confidence interval)</th>
<th>Five year % (95% confidence interval)</th>
<th>Ten year % (95% confidence interval)</th>
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</thead>
<tbody>
<tr>
<td>2005-2007</td>
<td>1579</td>
<td>96 (95-97)</td>
<td>95 (94-96)</td>
<td>91 (90-93)</td>
<td>82 (80-84)</td>
</tr>
<tr>
<td>2008-2010</td>
<td>2230</td>
<td>97 (96-97)</td>
<td>96 (95-96)</td>
<td>92 (91-93)</td>
<td>89 (87-92)</td>
</tr>
<tr>
<td>2011-2013</td>
<td>2229</td>
<td>97 (96-98)</td>
<td>96 (95-97)</td>
<td>91 (90-92)</td>
<td>88 (86-90)</td>
</tr>
<tr>
<td>2014-2017</td>
<td>2609</td>
<td>98 (98-99)</td>
<td>96 (95-97)</td>
<td>92 (91-93)</td>
<td>89 (87-91)</td>
</tr>
</tbody>
</table>

Table 11.6  **Patient survival after first adult living donor kidney transplant**

<table>
<thead>
<tr>
<th>Year of transplant</th>
<th>No. at risk on day 0</th>
<th>One year % (95% confidence interval)</th>
<th>Two year % (95% confidence interval)</th>
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<td>99 (98-99)</td>
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<td>94 (93-95)</td>
<td>89 (87-91)</td>
</tr>
<tr>
<td>2011-2013</td>
<td>2228</td>
<td>99 (99-99)</td>
<td>98 (97-99)</td>
<td>95 (94-96)</td>
<td>90 (88-91)</td>
</tr>
<tr>
<td>2014-2017</td>
<td>2609</td>
<td>99 (99-99)</td>
<td>98 (97-99)</td>
<td>95 (94-96)</td>
<td>90 (88-91)</td>
</tr>
</tbody>
</table>
Risk-adjusted five year graft (death censored) survival rates for first live donor kidney transplants in adult patients, between 1 April 2010 and 31 March 2014
Optimise the donor organ
Optimise the transplanted organ
Optimise the recipient
A self marker (MHC) labels the body’s cells as a ‘friend’ and are tolerated by the immune system.

An antigen is a molecule that the immune system recognises as foreign (non-self) and treats as a ‘foe’.

Human Leucocyte Antigen = Major Histocompatibility Complex
### Donor-Recipient Matching in Kidney Transplantation

<table>
<thead>
<tr>
<th>Principle</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABO compatibility</td>
<td>Avoids hyperacute rejection</td>
</tr>
<tr>
<td>Best HLA match (HLA-DR &gt; HLA-B &gt; HLA-A)</td>
<td>Reduces risk of acute rejection&lt;br&gt;May improve graft survival&lt;br&gt;Prevents allo-sensitisation</td>
</tr>
<tr>
<td>No preformed anti-donor HLA antibodies (negative cross-match)</td>
<td>Avoids hyperacute rejection</td>
</tr>
<tr>
<td>Minimise cold ischaemia time</td>
<td>Reduces allograft injury</td>
</tr>
</tbody>
</table>
HLA “Mismatches”

Convention describes relationship between donor and recipient HLA type as “mismatches”

6 potential mismatches (2A, 2B, 2DR)

- e.g: 1,0,1 = A 1 matched, B both matched, DR 1 matched
- e.g: 0,1,0 = A both matched, B 1 matched, DR both matched
- 0,0,0 = A, B & DR all matched
HLA-A+B+DR Mismatches
Deceased Donor, First Kidney Transplants 1985-2009

% Graft Survival

Years

0 MM  n= 9,510
1 MM  n=13,281
2 MM  n=30,137
3 MM  n=42,020
4 MM  n=32,361
5 MM  n=15,797
6 MM  n= 4,832
### HLA match is less important with living donors

<table>
<thead>
<tr>
<th>Degree of HLA MM</th>
<th>Unadjusted 5yr survival by donor type</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Extended criteria donor</td>
<td>Standard criteria donor</td>
</tr>
<tr>
<td>0</td>
<td>60%</td>
<td>74%</td>
</tr>
<tr>
<td>1</td>
<td>53%</td>
<td>71%</td>
</tr>
<tr>
<td>2</td>
<td>57%</td>
<td>71%</td>
</tr>
<tr>
<td>3</td>
<td>52%</td>
<td>70%</td>
</tr>
<tr>
<td>4</td>
<td>52%</td>
<td>70%</td>
</tr>
<tr>
<td>5</td>
<td>50%</td>
<td>66%</td>
</tr>
<tr>
<td>6</td>
<td>47%</td>
<td>65%</td>
</tr>
</tbody>
</table>

Source: 2005 Report from US Organ Procurement and Transplantation Network and the Scientific Registry of Transplant Recipients
Cell-based HLA antibody screening
Solid phase immunoassays for HLA antibody screening

ELISA

Luminex

Diagram showing the process of sample analysis in Luminex technology.
Donor-specific HLA antibody leads to increased rejection

Dunn et al
Donor-specific HLA antibody leads to **poorer graft survival**

![Graph showing graft survival over time post transplant](image)

Stratification of Immunological risk

• “Low risk”
  - non-sensitised patient receiving minimally HLA mismatched organ in the absence of current or historical donor reactive antibodies

• “Intermediate risk”
  - sensitised patients with HLA antibodies (but not donor-specific)
  - or chance of prior donor sensitisation (even in absence of current antibody)
    • Husband to Wife
    • Child to Mother
    • Previous transplanted organ
Stratification of Immunological risk

- **“High risk”**
  - patients who are cross-match negative by flow-cytometry but who have a current or historic donor-specific antibody which arose following exposure to this antigen from a previous solid organ transplant or pregnancy (these patients require augmented immunosuppression)

- **“Very High risk” - HLA Antibody incompatible**
  - patients who are cross-match positive by flow-cytometry are deemed HLA Antibody incompatible (these patients require measures to remove the DSA pre-transplant plus augmented immunosuppression)
The Clinical Conundrum

**Immunosuppression**

*Under*
- Acute rejection
- Chronic rejection

*Over*
- NODAT - Diabetes
- Nephrotoxic
- Infection - CMV, BK, UTI
- Malignancy - PTLD, Skin

---

This diagram illustrates the balance between under- and over-immunosuppression, highlighting the potential complications associated with each. The red circle represents the potential for harm, indicating the need for careful management of immunosuppressive therapies to prevent both acute and chronic rejection, as well as the associated risks of infection, malignancy, and diabetes.
Immunosuppression - basic principles

• Acute rejection risk & graft loss highest in the first three months

⇒ immunosuppression is at its highest during this period

• serious side effects of immunosuppressive therapy (i.e. infections and malignancy) correlate with total immunosuppressive burden

⇒ immunosuppression taper to maintenance level by 6 to 12 months
**Principal side effects of immunosuppressive therapy**

<table>
<thead>
<tr>
<th>Corticosteroids</th>
<th>Ciclosporin</th>
<th>Tacrolimus</th>
<th>Azathioprine</th>
<th>Mycophenolate mofetil</th>
<th>Sirolimus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypertension</td>
<td>Nephrotoxic effects</td>
<td>Nephrotoxic effects</td>
<td>Marrow suppression</td>
<td>Diarrhoea gastrointestinal upset</td>
<td>Hyperlipidaemia</td>
</tr>
<tr>
<td>Glucose intolerance</td>
<td>Hypertension</td>
<td>Hypertension</td>
<td>Cytomegalovirus infection</td>
<td></td>
<td>Thrombocytopenia</td>
</tr>
<tr>
<td>Dyslipidaemia</td>
<td>Glucose intolerance</td>
<td>Glucose intolerance</td>
<td></td>
<td></td>
<td>Poor wound healing</td>
</tr>
<tr>
<td>Osteoporosis</td>
<td>Dyslipidaemia</td>
<td>Insulin-dependent diabetes mellitus</td>
<td></td>
<td></td>
<td>Lymphocele</td>
</tr>
<tr>
<td>Poor wound healing</td>
<td>Gum hyperplasia</td>
<td>Dyslipidaemia</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Induction immunosuppression

• Monoclonal antibodies
  – Basiliximab (anti-IL2 receptor)
  – Alemtuzumab (anti-CD52) - (CamPath)

• Polyclonal antibodies
  – Anti-thymocyte globulin ATG (rabbit)
Immunosuppression Protocol

- **Induction:**
  - Basiliximab (Simulect®) 20mg IV administered by anaesthetist pre-operatively (day 0) and on day 4 post-operatively on the ward.
  - Tacrolimus (Adoport®) 0.05mg/kg PO 1 hour pre-operatively.
  - Methylprednisolone 1g IV administered by anaesthetist pre-operatively.

- **Maintenance:**
  - Tacrolimus (Adoport®) 0.05mg/kg orally BD adjusted according to trough tacrolimus levels.
  - Mycophenolate mofetil 500mg orally QDS.
  - Prednisolone 20mg orally OM for 2 weeks, then 15mg for 2 weeks, then 10mg for 4 weeks then 5mg OM and continue for 6 months then review.

  **Tacrolimus levels**
  - Low risk: Trough 3-7ug/l
  - Standard & High risk: Trough 10-12ug/l for 2 months then 8-10ug/l
Preventing drug toxicity

- Steroid sparing regimens, and steroid avoidance
- Reduce calcineurin inhibitor dose after early post transplant period
- Calcineurin inhibitor avoidance
- Single drug regimens

- Higher rates of acute rejection
“Symphony Study 2007”

Reduced Exposure to Calcineurin Inhibitors in Renal Transplantation

Henrik Ekberg, M.D., Ph.D., Helio Tedesco-Silva, M.D., Alper Demirbas, M.D., Stefan Vlto, M.D., Björn Nashan, M.D., Ph.D., Alp Gürkan, M.D., F.A.C.S., Raimund Margreiter, M.D., Christian Hugo, M.D., Josep M. Grinyó, M.D., Ulrich Frei, M.D., Yves Vanrenterghem, M.D., Ph.D., Pierre Daloze, M.D., and Philip F. Halloran, M.D., Ph.D., for the ELITE–Symphony Study

Tacrolimus levels
Low risk: Trough 3-7μg/l
Rationale: *early intervention*

Molecular and cellular surveillance strategies anticipate histological and clinical rejection.

*D. Anglicheau & M. Suthanthiran Transplantation 2008; 86: 192*
3 anastomoses and that’s it
Incision
Extravesical / Onlay – Lich-Gregoir
interrupted / continuous
Ureteric anastomosis – standard approach

- Ureter to bladder – Lich-Gregoir (Campos-Friere)
  - Role of Transplant Ureteric JJ stent

Urology, Volume 3, Issue 3, March 1974, Pages 304-308

Geraldo de Campos Freire, Gilberto Menezes de Góes, J. Geraldo de Campos Freire
Early post op issues

• Fluid balance: can have high UO - 4 litres/24 hours
• Bleeding: Haemoglobin & drain output
• Arterial/Venous thrombosis - 1%
  Suspect if sudden fall in UO (take care to account for any native output)
  Gross haematuria
  Graft tenderness
  Management- urgent Doppler/ Surgical exploration
• Urinary leak: 1%-2%
  Unexplained abdominal pain, decreased UO, increased drain volume.
  Rise in serum creatinine, check drain fluid creatinine
  Management- catheter/surgical
• Recurrent 1’ FSGS- urinary protein creatinine ratio
Prophylaxis

- Arterial Thrombosis - aspirin
- sc heparin only if increased risk venous thrombosis
  - e.g. anti-phospholipid syndrome
- Peptic ulcer - Rantidine or PPI
- Infection
  - PCP: Co-trimoxazole, Dapsone, Pentamidine nebs
  - CMV: Valgancyclovir if Donor positive to Recipient negative
  - TB: Isoniazid/pyridoxine
Late graft loss remains problematic
Getting the balance right
Post-transplant infection - general principles

• Common community-acquired AND rarer opportunistic infections

• Fewer symptoms, muted clinical findings, delayed clinical presentation

• Drug resistance more common
• May need urgent treatment

• Potential drug interactions
• Drug levels only crudely estimate immunosuppressive burden

➢ Focus on disease prevention: prophylaxis and vaccination
Timeline of post-transplant infections

- **Conventional nosocomial infections**
  - Viral: HSV, Onset of CMV
  - Bacterial: Wound or catheter infections, pneumonia
  - Fungal: Candida

- **Unconventional or opportunistic infections**
  - Viral: EBV, VZV, influenza, RSV, adenovirus
  - Bacterial: Nocardia
  - Fungal: Aspergillus

- **Community acquired or persistent infections**
  - Viral: CMV retinitis or colitis
  - Bacterial: Nocardia, tuberculosi
  - Fungal: Pneumocystis, Cryptococcus
Viral Infections post-transplant

• Community-acquired (e.g. common respiratory viruses)

• Latent viruses (e.g. HSV, CMV, VZV, hepatitis B and C, papillomavirus, and polyomavirus)

• Donor-derived (e.g. CMV, EBV, hepatitis B & C, HIV, rabies)
Post-transplant malignancy

- Lymphoma
- PTLD
- BCC
- Native Kidney
- RCC
- Kaposi Sarcoma
- Bladder Cancer
- HPV-related
Post-transplant malignancy

<table>
<thead>
<tr>
<th>Cancer Site</th>
<th>No. Cases</th>
<th>Expected No.</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nonmelanoma skin</td>
<td>127</td>
<td>5.1</td>
<td>24.7</td>
</tr>
<tr>
<td>Thyroid and other endocrine</td>
<td>30</td>
<td>2.1</td>
<td>14.3</td>
</tr>
<tr>
<td>Mouth, tongue, and lip</td>
<td>22</td>
<td>1.6</td>
<td>13.8</td>
</tr>
<tr>
<td>Cervix, vulva, and vagina</td>
<td>39</td>
<td>3.6</td>
<td>10.8</td>
</tr>
<tr>
<td>Non-Hodgkin lymphoma</td>
<td>25</td>
<td>2.4</td>
<td>10.3</td>
</tr>
<tr>
<td>Kidney and ureter</td>
<td>32</td>
<td>3.5</td>
<td>9.1</td>
</tr>
<tr>
<td>Bladder</td>
<td>26</td>
<td>4.7</td>
<td>9.1</td>
</tr>
<tr>
<td>Colorectal</td>
<td>38</td>
<td>10.5</td>
<td>3.6</td>
</tr>
<tr>
<td>Lung</td>
<td>30</td>
<td>12.5</td>
<td>2.4</td>
</tr>
<tr>
<td>Brain</td>
<td>10</td>
<td>4.1</td>
<td>2.4</td>
</tr>
<tr>
<td>Prostate</td>
<td>11</td>
<td>5.2</td>
<td>2.1</td>
</tr>
<tr>
<td>Melanoma</td>
<td>7</td>
<td>4.1</td>
<td>1.7</td>
</tr>
<tr>
<td>Breast</td>
<td>15</td>
<td>13.6</td>
<td>1.1</td>
</tr>
</tbody>
</table>
Recurrent renal disease

- 3\textsuperscript{rd} commonest cause of graft loss
- FSGS
- Membranous GN
- MCGN type 1 and 2
- IgA
- Diabetic nephropathy
- HUS
Summary points

• Increasing effectiveness of transplantation allows many more patients to be considered, **but** ongoing shortage of donors

• Outcomes living donor kidneys much better than deceased donor kidneys
  
  – **Optimise Donor**
  
  – **Optimise Organ**
  
  – **Optimise and Monitor Recipient**
Summary points - 2

• Improvements in managing early acute rejection have not led to impressive long-term improvement in graft and patient survival

• Strategies to minimise rejection include immunological matching and identification / avoidance of preformed anti-donor HLA antibodies

• Immune-suppression still corticosteroid & calcineurin inhibitor-based, in spite of side effects

• Main side-effects - increased risks of infection, malignancy & diabetes
Living Donation

Increasing Supply: Living Donation
Living Donation

- Relative / friend / colleague

- Strangers...
  - Altruistic
  - "Good Samaritan"
  - Unspecified
Living Donation – Standard Direct Donation
Living Donation – Paired Exchange
Living Donation – National Kidney Sharing

Guy’s London

Leeds

Edinburgh
Living Donation – Domino Chains

- Altruistic donors
- Therapeutic nephrectomy
- Human Tissue Act
Altruistic (non-directed) Donors

• Controversial!
  – Challenges traditional views on medical ethics
    • Where does the benefit lie?

• Issues
  – Troubles some transplant professionals
  – Is illegal in some parts of the world
  – Assumption of psychopathology
Non-directed Donors

• However…
  – Around 80 people do this each year in the UK
  – 9% of living donor programme nationally

• Very motivated group of individuals
  – They have their own charity…
Give a Kidney is a charity that aims to raise awareness of non-directed (also known as altruistic) living kidney donation in the UK.

"It was a doddle – I slept through the whole thing!"

Colin McLachlan, donated a kidney at Edinburgh Royal Infirmary.

'No waiting for a transplant for want of a kidney'
Altruistic Donors

• Outcomes:
  – Very positive
  – No significant difference with people donating to someone they know

• There are some differences…
  – Demographics
  – Altruistic behaviours
  – Fits in with lifestyle
Altruistic Donors

• Getting the transplant community on board
  • Improved in recent years
  • Need to address issues / concerns

1. Psychopathology
2. Motivations
3. Outcomes
   1. Who will donate?
   2. Who may get screened out and why?
4. What is a living donor kidney worth?

• What is the best way to use these kidneys?
  – Hit the jackpot!
  – Donor chains
Non-directed donor

Incompatible donor-recipient pairs

Waiting list recipient

Often very difficult to transplant
- Highly sensitised
- May otherwise not be transplanted
Non-directed Donors
1 non-directed donor = 20 kidney transplants
Non-directed Donors

• Making a massive contribution to the waiting list
• UK has largest kidney exchange programme in Europe
  • Surge in 2018
  • 48% donated as part of a chain in 2018

• 33 donors
  – 82 transplants
    • Combination of short and long chains
Donor Stones - Bench URS

Before Fragmentation

After Laser Fragmentation
Hand Assisted Laparoscopy
Donor Nephrectomy
Technique

• Transverse / midline 7cm
• 2 x 12mm ports
• Donor Safety
• Donor QOL; Pain; LoS; Cosmesis
• Recipient outcome
• Reproducible across department
• Ability to train / teach

Risk is with Recipient not Donor
• Energy source - Thunderbeat
• Dissect colon medial
• Gonadal vein to renal vein
• Thunderbeat / Ligasure - gonadal + adrenal veins
• Mobilise kidney
• Ureter divided at pelvic brim - clips
• A / V articulated linear stapler

Left HALDN
Right side

- **Why right?**
  - Single R v multi L RA
  - Split function
  - Stone / Benign mass

- **Potential problems**
  - Short renal vein
  - Liver retraction
    - Extra 5mm port

- 2 Renal Arteries to Left 1.8cm apart
- 1 Renal Artery to Right
Right HALDN
Energy Sources
Lap Emergency Trolley
“First do no harm”

- Donor safety paramount
  - Major intraoperative risk – bleeding
    - Friedman 2006 - 2 lap donor fatalities – non-locking clips RA
  - Bowel diathermy injury
    - Oyen 05
- Minimise donor morbidity
- Maximise recipient outcome

Risk is with Recipient not Donor
Patient preference

Cosmesis – where do they want the scar?

Right HALDN

Left HALDN
HALDN v Other techniques

- Donor Safety
- Donor QOL
- Recipient outcome
- Reproducible across department
- Ideal for training

- Mini-open
- Pure Lap
- Retro Lap
- Robot-assist Trans Lap
## Costs - The bigger picture?

<table>
<thead>
<tr>
<th><strong>Theatre time</strong></th>
<th><strong>Re-usable equipment</strong></th>
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</thead>
<tbody>
<tr>
<td>HALDN: 180 min</td>
<td>Lap stacks etc; Lap instruments</td>
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### Consumables

<table>
<thead>
<tr>
<th>Item</th>
<th>£</th>
<th>Item</th>
<th>£</th>
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<tbody>
<tr>
<td>Thunderbeat</td>
<td>387</td>
<td>Harmonic</td>
<td>407</td>
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<tr>
<td>Stapler</td>
<td>294</td>
<td>Ligasure</td>
<td>411</td>
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<tr>
<td>Stapler reload x2</td>
<td>244</td>
<td>Hemolock</td>
<td>24</td>
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<tr>
<td>Gelport</td>
<td>281</td>
<td>Fibriliar</td>
<td>60</td>
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<tr>
<td>Trocars x2</td>
<td>67</td>
<td>Dermabond</td>
<td>22</td>
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<tr>
<td>Sucker</td>
<td>93</td>
<td>TOTAL</td>
<td>1500</td>
</tr>
</tbody>
</table>

**Hospital stay:** 2-4 days (culture)

**Time back to work:** 3 v 6 weeks?
Pain management

- 20mls 0.5% levo-bupivicaine between peritoneum and fascia
- LA wound infiltration skin / ports
- LA Infusion pump – 0.125% L-BP
- Fentanyl PCA – low background & demand
- Paracetamol iv / po
- +3 days Ibuprofen with PPI cover
Training
50 years of Renal Transplantation at Guy’s - the early years

1962 Acute HD & PD
Aug 1966 long-term HD
Richard Batchelor (1931-2015)
tissue typing and matching (trained by Peter Gorer)
May 1967 1st transplant
Nov 1968 1st paediatric transplant
Frank Ellis & Michael Joyce
Mick Bewick 1968; Geoff Koffman & John Taylor 1970/80s

1976 500 Tx in SE region (421 DD; 79 LD)
1979 1000 Tx (820 DD (DCD); 180 LD)
2019 - 50 years of Renal Transplant at Guy’s

6745 Adult Transplants
856 Paediatric Transplants
Pioneering Robotics

Transplant Urology

Robotics

HIV transplants

3D printing

EVNP
Living Donor Kidney Transplantation

The Donor & The Recipient

Kidney Transplantation
History, UK perspective & Guy’s Hospital perspective
Recipient Medical Aspects
Surgical Aspects of Kidney Transplant
Living Donation
Donor Medical & Psychological Aspects
Surgical Aspects of Donor Nephrectomy
Questions
Thank you