Paired Kidney Exchange / Kidney Paired Donation

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Overview

- Definition
- The **how**, **why**, **who** and **where** of PKE
- Types of PKE
- Advantages / disadvantages
- PKE for our patients
- Recent cases
Definition

- Exchange of kidneys between 2 pairs of (each pair a living donor + recipient)

- Typically, the pair cannot donate / transplant directly because of incompatibility of:

  ABO / HLA / both
How?
Paired Donation Numbers are Related to Size of Database

Why?

• Significant % of ESRD pts will have an ABOi living donor

• Significant % of ESRD pts are sensitized and have an HLAi living donor

• LD transplant options for these pts are thus very limited

• PKE offers another mechanism to allow LD transplantation
Why?

• Still receive a LD transplant
• Circumvent problem of incompatability
• Less immunosuppression
• Lower risk of rejection and allograft loss
• Less costly
• Ultimately, more transplants
Who?

- Potentially anyone eligible for transplant who has a willing but incompatible living donor

Expanding now to include:

- Altruistic living donors
- Pairs who are compatible but might benefit from a different living donor
Where?

- S Korea, India
- USA, Canada,
- Netherlands, UK
- Australia

- In some countries the donor travels, in others the kidney travels
- Legal issues
Increasing Complexity of LD

- Non-simultaneous donation / transplantation
- Legal issues
- Geographic issues (long distances)
- Use of internet, social media
- Australia
- Chains
- Dominos
- Altruistic donors
- Compatible donors!
Paired Kidney Exchange: Chains
Domino Paired Kidney Exchange:
60 Lives, 30 Kidneys, All Linked

FROM START TO FINISH A donation by a Good Samaritan, Rick Ruzzamenti, upper left, set in motion a 60-person chain of transplants that ended with a kidney for Donald C. Terry Jr., bottom right.

By KEVIN SACK
Published: February 18, 2012 | 202 Comments

NY Times.....
Started with altruistic donor
BRIEF REPORT
A Nonsimultaneous, Extended, Altruistic-Donor Chain
Results to Date

Netherlands: de Klerk et al. Clin Trans 2010:
- 2004-2010: 422 pairs registered
- Central H+I lab
- Matches found for 218 (50%)
- 167 (40%) received a transplant

Australia: Ferrari et al., Transplantation 2012
- 38% received a PKE transplant
- 35% of these had PGEN >90%
24% enrolled in the UK pool have been transplanted

A: 36%
B: 24%
AB: 21%
O: 18%

No. of patients enrolled

<table>
<thead>
<tr>
<th>Sensitisation level</th>
<th>No. of patients enrolled</th>
</tr>
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<tbody>
<tr>
<td>0-9</td>
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<tr>
<td>10-84</td>
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<td>85-94</td>
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<td>95-100</td>
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Altruistic donor chains are excluded
Number of patients transplanted
(to Apr 2012 matching run)

No. of patients transplanted

- Compatible
- HLAI & ABOi
- HLAI
- ABOi

Belfast
Birmingham
Bristol
Cardiff
Coventry
Edinburgh
Glasgow
Leeds
Leicester
Liverpool
GOSH
Guy's
St George's
The Royal Free
The Royal London
WLRTC
Manchester
Newcastle
Nottingham
Oxford
Plymouth
Portsmouth
Sheffield

Altruistic donor chains are excluded

NLDKSS Workshop, September 2012
Disadvantages

Transplant may never happen. Why?

• Matchruns not successful

• Matchrun successful but transplant does not proceed

• Still difficult for ABO-O or highly sensitized pts to find a match

• Donor issues arise

• Recipient issues arise
Other Disadvantages

- Prolonged waiting for a transplant
- Stress of waiting for the matchrun results
- Costs of evaluating many potential LDs
- Preserving anonymity
- Poor outcome with 1 of the transplants?
- Donor withdrawal (very rare)
PKE for Irish Patients
Paired Donation Numbers are Related to Size of Database

Practical Aspects

- Currently referring adult pts to 2 centres in UK: Coventry (RH), Royal Free (GJ)
- HSE, in principle, are agreeable to this
- Consider in all cases where there is a suitable / willing donor who is either ABO or HLA incompatible
- Remember the donor might have been previously rejected because of ABOi
- So…ask your pt about interested family members / friends
Identify recipient + donor (1 or 2) →
HSE Approval →
Donor + Recipient outpatient appt in UK centre →
Donor evaluation in Ireland →
Enrollment in UK-PKE →
Successful matchrun →
Transplant
What if matchrun not successful?

- Try and enroll an ABO-O donor, if possible!
- Do at least 3 matchruns

If no success after 3, consider:

- Expanding number of acceptable mismatches
- Finding a ‘near perfect’ rather than perfect donor
- Direct donation and limited form of desensitization (only if low DSA)
Model 1: Kidney exchange between pair 1 (orange) and pair 2 (green) circumvents problem of positive crossmatch that exists within pair 2.

Model 2: Kidney exchange between pair 1 (orange) and pair 2 (green) circumvents problem of highly positive crossmatch and allows transplant from ‘relatively compatible’ donor.
Case 1: ABO incompatible donor

- MN, 59 year old female
- ABO-O; PGEN 0%
- LD is ABO-B, HLA 1-1-2 mismatch

Options?
Case 2: ABO and probably HLA incompatible donor

- GB, 50 year old female
- ABO-O; PGEN 99%
- LD is ABO-A

Options?
Case 2: ABO and HLA incompatible donors

- DM, 51 year old male with ESRD due to ADPKD
- ABO-O, PGEN 99%
- 2 interested living donors: but ABO or HLA incompatible or both
Take Home Points

• In approx 30% of cases, the LD will not be suitable by ABO or HLA

• Always consider PKE in this situation

• Don’t forget to ask about others interested in donation who were turned down before

• Ultimately, a range of options will be needed for many pts: acceptable mismatch program, PKE, limited desensitization, ABOi transplant
Solving the ‘stable marriage problem’: If you have a group of men, and a group of women, could an algorithm be designed which would pair everyone up with a stable match?
Thanks to

- Dr Aisling Courtney, Nephrology, Belfast