Insulin therapy in pancreas donors as a predictor of subsequent transplant outcome

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Introduction

- Brain stem death causes high levels of systemic catecholamines and inflammation affecting all organs.
- Hyperglycaemia following brain death is common and is managed with insulin in about half of all donors.

Aim

- We hypothesised that donor insulin use (DIU) is a marker of irreversible pancreatic beta-cell death.
- We aimed to assess relationships of DIU to pancreas transplant outcome and function.

Methods

- National data from the UK Transplant registry (2004-2016) was reviewed retrospectively to determine donor variables associated with DIU and its relationship with graft survival.
- Early non-technical graft failure (transplant pancreatitis) was assessed from histology reports using our regional data.
- In a sub-group, we determined relationships between DIU and early c-peptide secretion.

Results

Table 1: Donor variables associated with insulin use in intensive care

<table>
<thead>
<tr>
<th>Donor variables</th>
<th>Donor insulin use in intensive care</th>
<th>p-value (univariate)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>Yes (n=1005)</td>
<td>35.65 (SD 13.14)</td>
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</table>
|                                        | No (n=938)                         | 34.17 (SD 13.85)     | 0.016
| Sex (male)                             | Yes (n=1005)                       | 460 (45.8%)          |
|                                        | No (n=938)                         | 507 (54.1%)          | <0.0001
| Ethnicity                              | White                              | 917 (93.5%)          |
|                                        | Asian                              | 24 (2.4%)            | 0.126
|                                        | Black                              | 16 (1.6%)            | 0.557
|                                        | Other                              | 24 (2.4%)            | 0.161
| BMI                                    | Yes (n=1005)                       | 23.49 (SD 3.58)      |
|                                        | No (n=938)                         | 23.77 (SD 3.57)      | 0.085
| Smoking (Y/N)                          | Yes (n=1005)                       | 496 (50.1%)          |
|                                        | No (n=938)                         | 479 (52.1%)          | 0.391
| Alcohol (Y/N)                          | Yes (n=1005)                       | 69 (7.2%)            |
|                                        | No (n=938)                         | 83 (9.3%)            | 0.088
| Hypertension (Y/N)                     | Yes (n=1005)                       | 74 (7.5%)            |
|                                        | No (n=938)                         | 89 (9.7%)            | 0.083
| Cardiac disease (Y/N)                  | Yes (n=1005)                       | 34 (3.5%)            |
|                                        | No (n=938)                         | 26 (2.9%)            | 0.474
| Cardiac arrest (Y/N)                   | Yes (n=1005)                       | 275 (28.2%)          |
|                                        | No (n=938)                         | 299 (33.4%)          | 0.015
| Creatinine                             | Yes (n=1005)                       | 81.29 (SD 47.8)      |
|                                        | No (n=938)                         | 82.04 (SD 51.87)     | 0.78
| Peri-retrieval hypotension             | Yes (n=1005)                       | 660 (67.0%)          |
|                                        | No (n=938)                         | 542 (61.0%)          | 0.004
| Donor Type (DBD)                       | Yes (n=1005)                       | 909 (90.4%)          |
|                                        | No (n=938)                         | 699 (74.5%)          | <0.0001

Conclusions

- DIU could be a useful clinical predictor of early pancreas graft outcome and function.
- Further understanding of the physiological processes causing hyperglycaemia in donors could improve donor selection and lead to better outcomes.