**Waiting for a liver transplant: Should waiting time count? Exploring the value of patience to a liver patient.**

**Aim/Background:** In the UK patients with liver diseases who need a transplant receive deceased donor livers offers matched to blood group, weight (+/- 10kg) and transplant benefit score (TBS). Currently waiting on the list for 1000 days makes only a 0.4% change to the TBS highlighting that time on the waiting list has negligible impact on the TBS. Patients with low scores could remain on the list for years without a realistic chance of ever receiving a donor liver offer via the National allocation system. However, prioritising the patients who are waiting the longest may increase time to transplant for those with the most predicted benefit. This study investigates the potential consequences of allocating additional points for time on the waiting list.

**Methods:** Potential donor (n=100,000) and recipient patient (n=100,000) populations were generated with characteristics matched to real world patients. Based on NHS BT transplant 2021-22 activity a simulated national waiting list (WL) was generated by randomly sampling from the potential recipient population (n=650). A 1-week cycle of transplant activity included 20 donors sequentially matched to 20 WL patients (blood group, weight +/-10kg, highest TBS), followed by 20 recipients added to the waiting list by random sampling from the potential recipient population. This was repeated 520 times to reflect 10 years of transplant activity. Three different scenarios were considered: 0, 10 or 20 additional points per week on the waiting list. Each simulation was repeated 20 times. Time to transplant all patients on the starting WL and time to transplant for the highest 25% TBS scores were then considered.

**Results:** Donor and recipient weight and blood group profiles were similar to real world patients. TBS of transplanted patients as compared to TBS of real-world transplanted patients were similar (figure 1).

When no additional points were given for being on WL, at the end of 1year 14.6% of initial patients remained on the list and at the end of 10 years 5.6% of patients were still waiting. On giving 10 additional points for being on WL, 21.2 % of the initial patients remained waiting at 1 year but at the end of 3 year none of original patients were still waiting. On giving 20 additional points for being on WL, 10.7 % of the initial patients remained waiting at 1 year but at the end of 3 year none of original patients were still waiting (figure 2).

Median time to transplant for the highest scoring 25% of waiting list patients was 2 weeks when no additional points were given for waiting. This increased to 4 weeks and 17.5 weeks when 10 & 20 additional points were given for waiting respectively (figure 3).

**Conclusion:**

Without additional points for waiting time 5.6% of the original population would not receive a transplant within 10 years. Additional points for time on the waiting list ensured all patients had access to transplantation. However, this could potentially increase time to transplant for the top 25% patients on the list. A delicate balance could be achieved by giving 10 additional points per week for waiting on the list.

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