Abstract Type : Oral Presentation
Abstract Submission No. : F-008802

A Report on the Longest Graft Survival of a Porcine Kidney Transplanted into a Non-Human-Primate in Korea

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Long-term survival of a porcine kidney graft transplanted into a non-human primate (NHP) for more than 6 months is a prerequisite for the successful clinical translation of xenotransplantation in the current era. We recently achieved long-term porcine kidney graft survival in an NHP and share our experience here.A kidney was harvested from a genetically modified pig (Optipharm Inc, Cheongju, Korea). The donor pigs genetic modifications include triple knockout (GGTA1, CMAH, and B4galNT2) and double knock-in (hCD55 and hCD39). The donor pig weighed 11.5 kg, and the transplanted kidney weighed 28 g. The recipient was a cynomolgus macaque weighing 3 kg.Rituximab and thymoglobulin were used for induction immunosuppression. Maintenance immunosuppression included once-daily tacrolimus, mycophenolate mofetil, steroids, and anti-CD154 monoclonal antibody. Cobra venom factor was employed to inhibit the complement response.Following a midline incision, the porcine kidney was transplanted into the recipients right iliac fossa. Immediate post-transplant urine output was satisfactory. The recipients right kidney was removed simultaneously, and the left kidney was removed on post-transplant day 75. Following native kidney removal, the recipients renal function remained stable. Serum creatinine was 0.77 mg/dL on post-transplant day 98, a favorable result compared to the recipients baseline level of 0.94 mg/dL. Renal function remained stable until post-transplant day 182 (serum creatinine was 0.98 mg/dL). However, renal function deteriorated after post-transplant day 210, leading to euthanasia on post-transplant day 221 due to renal failure. Histopathologic findings are pending.We present a case of long-term survival involving a porcine kidney transplanted into an NHP and anticipate the clinical translation of xenotransplantation in the near future.