

Living-Donor Parathyroid Cells Allotransplantation in a Kidney Transplant Recipient – Two-Year Results

Sir,

We want to discuss a case scenario of a 37-year-old female with end-stage renal disease (ESRD) from chronic glomerulonephritis and tertiary hyperparathyroidism, who was treated with total parathyroidectomy with reimplantation in the forearm of two parathyroid glands. This parathyroid autograft failed rapidly, and severe hypoparathyroidism developed. The patient was dependent on high doses of oral calcium (up to 4 g/day), cholecalciferol (up to 1 800 IU/day), calcitriol (1.25 µg/day), and frequent (1–2 times per week) IV injections of 2–4 g of calcium gluconate. The transplantation of a cadaveric kidney was performed, and immunosuppressive therapy was prescribed (cyclosporine 150 mg/day, mycophenolic acid 720 mg/day, methylprednisolone 6 mg/day). The kidney functioned immediately with rapid normalization of the renal function. At the same time despite taking optimum daily medications, calcium and parathyroid hormone (PTH) levels remained very low (total and ionized calcium: 1.71 and 0.98 mmol/L, normal, 2.15–2.55 and 1.12–1.32 mmol/L, respectively; PTH: 1.7 pg/mL, normal, 15–65 pg/mL), and symptoms, such as transient tetany and seizures were not relieved. In addition, the patient complained of paresthesia, muscle weakness, fatigue even on slight physical or mental exertion. The patient required multiple hospitalizations for IV calcium administration for the life-threatening symptoms described previously.

Taking into account an extremely severe course of hypoparathyroidism, refractory hypocalcemia, and persistent immunosuppression, it was decided to perform allotransplantation of the cultured parathyroid cells extracted from the parathyroid tissue of a living-unrelated donor (a woman aged 62 years old) with parathyroid hyperplasia secondary to ESRD. HLA-typing was not performed. Written informed consent was obtained from both the recipient and the parathyroid tissue donor. The approval of the local ethics committee had been obtained.

Under the local anesthesia, 2 µL of the cell suspension (21×10^6 of parathyrocytes) was injected via an 18-gauge

needle into the left brachioradial muscle. After the first month of transplantation, serum calcium levels remained in the subnormal range, whereas the PTH level progressively increased [Table 1]. Within 2 months after the parathyroid transplant, calcium and PTH levels normalized and remained within the physiological limits after 24 months of follow-up and up to the present day. The symptoms of tetany, seizures, muscle weakness, and paresthesia resolved, and the recipient was able to carry out all the activities of daily living without any help. The volume of oral substitution therapy reduced significantly (from 13–15 to 1–2 tablets), and there was no need for parenteral administration of calcium salt solutions. The patient is currently taking only 0.5 g of oral calcium a day as a usual supplementation taken by almost all kidney transplant patients.

Severe hypocalcemia after parathyroidectomy is uncommon, but in 1%–2% of patients, it may occur.^[1] It is a quite serious complication causing dependence on a high dose of calcium and vitamin D supplementation with long-term risks of paresthesias, multiorgan calcinosis, and renal failure.^[2] Parathyroid cell allotransplantation has been described sporadically over the last 40 years as a potential therapy for permanent hypoparathyroidism, but the existing evidence from the primary studies is very limited, suggesting an urgent need to investigate the observed benefit further.^[3–5] Our case adds to the literature regarding the benefits of parathyroid cell allotransplantation in hypoparathyroidism.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given her consent for her images and other clinical information to be reported in the journal. The patient understands that her names and initials will not be published and due efforts will be made to conceal her identity, but anonymity cannot be guaranteed.

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Nil.

Table 1: Serum calcium, PTH, and medical therapy evolution before and after parathyroid transplantation

Data	Before transplant	Months after transplant							
		1	2	3	6	8	12	18	24
Total calcium (mmol/L)	1.71	1.94	2.58	2.4	2.19	2.0	2.06	2.42	2.29
Ionized calcium (mmol/L)	0.98	1.05	1.38	1.29	1.12	1.1	1.07	1.34	1.28
iPTH (pg/mL)	1.7	14.7	32.7	61.7	43.4	20.0	31.4	14.2	16.6
Ca per os (g/day)	4.0	0.5	0	0	0.5	0.5	0.5	0.5	0.5
Calcitriol µg/day	1.25	0.5	0.25	0.25	0.25	0.25	0	0	0

Normal range: iPTH: 15–65 pg/mL; total calcium: 2.15–2.55 mmol/L; ionized calcium: 1.12–1.32 mmol/L

Conflicts of interest

There are no conflicts of interest.

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