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Case report

## Successful En-Bloc Kidney Transplantation from a 5-year-Old Donor with Cerebral Palsy to a 60-Year Old Recipient: A Case Report

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### HIGHLIGHTS

- EBKT is an appropriate method in kidney transplants from deceased children.
- Kidneys of a deceased cerebral palsy child could be successfully transplanted for an adult using EBKT.
- CP pediatric donors can be good resources for transplantation.

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### ABSTRACT

#### Introduction

There are a growing number of unmet kidney donor sources. So, alternative donor sources, such as donation after circulatory determination of death (DCDD), are taken into the consideration.

#### Case presentation

In this study, we represent successful En-Bloc kidney transplantation from a 4-year-Old donor with cerebral palsy to a 60-year old recipient. The kidney of a 4-year-old boy with congenital CP (weight=12Kg; BMI=12) with brain death was transplanted to a 60-year-old man (weight =70Kg; BMI=23.6). Panel-reactive antibody (PRA) to HLA class I (PRA I) and HLA class II (PRA II) were observed less than 5% in the 60-year old recipient. Also, the PRA titer with complement-dependent cytotoxicity (PRA-CDC) and the donor-recipient WBC crossmatch was negative. Our case is reported by a successful EBKT to an adult with the en-bloc kidney of a 4-year-old child with cerebral palsy. The small kidneys of a cerebral palsy child are adapting and functioning well in the adult body.

#### Conclusions

Therefore, CP pediatric donors can be good resources for transplantation whenever available.

**Keywords:** Kidney Transplant; Pediatric Donors; Organ Donation; Circulatory Determination of Death

#### Introduction

Considering the increasing growth of end-stage renal dysfunction (ESRD) and shortage of kidneys for transplant around the world, maintaining a kidney is always a challenge (1). According to the reports (2018), 2263 kidney transplants including 1245 deceased (brain death) cases have been conducted in Iran (2). A kidney transplant from deceased children to the adult is a common

method that can be a noteworthy answer to the growing need for transplant kidneys and continuous expansion of transplant waiting lists (1). Currently, there are two kidney transplant methods including single kidney transplantation (SKT) and en-bloc kidney transplantation (EBKT), the application of each has its pros and cons (3,4). Some studies demonstrated more satisfactory results in EBKT transplant outcomes due to the increase in kidney volume

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and nephrons compared to SKT or even transplant from live donors (5-7). In our case report, EBKT was conducted on a 4-year-old deceased with cerebral palsy (CP).

### Case presentation

The donor was a 4-year-old boy with congenital CP (weight=12Kg; BMI=12) developing subarachnoid hemorrhage (SAH) resulting in brain death. The recipient was a 60-year-old man (weight =70Kg; BMI=23.6) with ESRD following diabetes and hypertension. Drugs used by the recipient include Amlodipine and Diazepam with three-year duration of dysfunction and 1.5 years undergoing hemodialysis. The patient agreed to report his case after signing the informed consent and report is based on CARE guidelines.

Panel-reactive antibody (PRA) to HLA class I (PRA I) and HLA class II (PRA II) were less than 5% in the recipient. PRA titer with complement-dependent cytotoxicity and the donor-recipient WBC crossmatch was negative.

Both kidneys catheterized from the proximal end of the aorta and were clamped to the superior celiac. After that, the vena cava inferior was oversewn and ureters were dissected as close to the bladder as possible. The distal ends of the donor aorta and vena cava were correspondingly anastomosed end-to-side to the recipient external iliac vein and common iliac artery with 5-0 prolene sutures. The ureters were inserted separately to avoid stenosis and double-J catheters (4-French, 14-cm) were implanted in each ureter and then they were withdrawn under local anesthesia six weeks after transplantation.

According to the Lich-Gregoir technique, the spaced uretero-cysto-anastomosis was performed using 4-0 Vicrylfor. Intravenous heparin was not used during the procedure. The cold and warm ischaemic times were 3 hours and 50 min, respectively.

Post-operative recovery was uneventful. Immunosuppressant drugs used were Methylprednisolone and ATG for induction; and after discharge, cyclosporine, mycophenolate mofetil, and methylprednisolone were prescribed. Serum creatinine level decreased from 2.02 mg/dl one week after transplantation.

Before transplantation, the hemoglobin level was 7.8 mg/dl, but on the fourth day postoperatively, a unit of the packed cell without leukocyte was injected due to hemoglobin decline (6.2 mg/dl). Doppler ultrasound scans were performed on day two post-operatively and its results showed normal renal resistive indices (0.63-0.7), normal blood supply, and normal collecting system in both kidneys. A transplanted kidney scan (Tc99m-DTPA) for renal perfusion study was performed 11 days after transplantation. The scan revealed proper perfusion of both kidneys in the dynamic phase. In the static phase, proper secretion and excretion were noted.

### Discussion

EBKT is an appropriate method in kidney transplants from deceased children because of the increase in volume and number of nephrons overcoming anatomic complications of the kidney (5-7). Moreover, kidney harvest from children with special diseases like CP can be effective in compensating for the shortage of transplant-appropriate kidneys. In the present study, the kidneys of a deceased CP boy could be successfully transplanted for a 60-year-old adult using EBKT. Findings of the 3-month post-transplant follow-up demonstrated successful transplantation. Accordingly, the kidneys grew bigger in three months, reaching the normal adult size. Other studies also show fast growth of children kidneys in adult recipients undergoing transplants using the en-bloc method (4, 8, 9).

Biopsies conducted three months postoperatively demonstrated glomerular maturity in the transplanted kidneys considering their age. Therefore, glomerular increase in transplanted kidneys takes place in line with the increase in kidney size appropriate with the age of the donor. Another study showed that the estimated glomerular filtration rate (eGFR) in adult recipients hosting children's kidneys via en-bloc is higher than those receiving kidneys from live adult donors and this represents the appropriate functional capacity of en-bloc pediatric kidney transplant (10, 11). Moreover, the study of Piepsz et al confirms that eGFR reaches the adult level in children of approximately 2 years (12). Thus, GFR levels in the transplanted kidney in our study would not be significantly different from the adult levels.

### Conclusions

This case report highlights the successful EBKT to an adult with the en-bloc kidney of a 4-year-old child with cerebral palsy and showed that the small kidneys of a cerebral palsy child are adapting and functioning well in the adult body. Therefore, CP pediatric donors can be good resources for transplantation whenever available.

### Authors' contributions

MHKH was responsible for the study conception and design. SD was responsible for acquisition of data. HA, and RM wrote the case report. FN was the supervision for this case-report.

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### Conflict of interest

All authors declare that there are no conflicts of interest.

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**Ethical statement**

All authors ensured our manuscript reporting adheres to CARE guidelines for reporting of case reports, and patient consent undertook before surgery.

**Data availability**

Data will be provided by the corresponding author on request.

**Abbreviation**

CP	Cerebral palsy
EBKT	En-bloc kidney transplantation
eGFR	Estimated glomerular filtration rate
ESRD	End-stage renal dysfunction
PRA	Panel-reactive antibody
SAH	Subarachnoid hemorrhage
SKT	Single kidney transplantation

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