Living Donor Kidney Transplantation in a Patient With Epidermolysis Bullosa: A Case Report


aDepartment of Surgery, Division of HPB & Transplant Surgery, Erasmus MC, Rotterdam, the Netherlands; bDepartment of Internal Medicine, Erasmus MC, Rotterdam, the Netherlands; cDepartment of Anaesthesiology, Erasmus MC, Rotterdam, the Netherlands; and dDepartment of Dermatology, University Medical Centre Groningen, the Netherlands

ABSTRACT

Severe recessive dystrophic epidermolysis bullosa is a very rare inherited disease with excessive blisters forming starting at birth. Surgical intervention in this population creates a challenge: preventing formation of new lesions while managing previously scarred tissues. We present a case of a 27-year-old patient with end-stage renal disease caused by rapidly progressive IgA nephropathy. Living donor kidney transplantation was performed under local, spinal and epidural anesthesia.

Living kidney transplantation in epidermolysis bullosa patients with end-stage renal disease should not be a contraindication for transplantation and should be considered as a viable and feasible option after careful preparation.

EPIDERMOLYSIS bullosa (EB) is a rare but serious genetic disease characterized by marked mechanical fragility of epithelial tissues with blistering and erosions after minor trauma or friction. It can be classified in 4 different subtypes depending on the location of the defect in the basal membrane: simplex, junctional, dystrophic EB (DEB), and Kindler syndrome. DEB, which can be divided into autosomal dominant and autosomal recessive forms, is caused by an anchoring fibril protein type VII collagen mutation resulting in separation of the sub-basal lamina [1]. The dominant subtype is characterized by localized blistering occurring at birth with an incidence of 1.49 cases per 1 million live births, whereas the recessive subtype can vary from mild-to-severe clinical presentation with an incidence of 1.35 cases per million live births [2].

Surgical interventions are challenging in this genetic disorder with epithelial fragility. We present a case of end-stage renal disease with recessive DEB (RDEB) successfully treated with a living donor kidney transplantation. This is the first report of a living donor kidney transplantation in a patient with EB, performed under local and regional anesthetics.

CASE REPORT

A 27-year-old man had been diagnosed with a severe form of generalized RDEB in the first week after birth when blisters appeared on his skin. Genetic studies showed collagen type VII mild positive, COL7A1:Q2170 X homozygote. He developed renal insufficiency in 2011, based on IgA nephropathy (IgAN), leading to end-stage renal disease in December of 2015. In an effort to treat IgAN prednisone was given. This resulted in amelioration of skin abnormalities, but deterioration of renal function progressed. Consequently, the option of a kidney transplantation was discussed with the patient and his family. His mother was willing to donate her kidney in a living-related kidney donation procedure. In December 2015 after considering peritoneal dialysis and hemodialysis, the patient preferred the option of a living donor kidney transplantation. Assessment for kidney transplantation was performed according to regular standards. Considering the difficulties arising from his dermatologic condition we consulted the expertise of the national center for bullous diseases, affiliated with the University Medical Centre Groningen. Due to the danger of seriously harming the mucosa of the larynx during intubation, the option of kidney transplantation was under combined spinal and epidural anesthesia was investigated.

His medication for skin care consisted of fusidic acid cream and cetirizine. He was still using prednisone, given for IgAN in reduced dose. He reported no allergies. Physical examination showed generalized redness, skin atrophy, and no blisters with a
body mass index of 18. During the renal transplant multidisciplinary meeting it was decided to perform the kidney transplantation under local and regional anesthetics to prevent mucosal damage during intubation. Due to skin fragility, only Mepitac with a soft silicon layer to minimize trauma to the skin could be used for any adhesive surface, such as surgical drapes, diathermy grounding plate, or electrocardiography sensors. The nurse practitioner who specialized in EB was invited to help with skin monitoring during the procedure in order to reduce skin and mucosa lesions.

In February 2016, he was admitted for a pre-emptive living-related kidney transplantation with his mother as the donor. The HLA A-B-DR mismatch was 1-1-1. After performing an uncomplicated fully laparoscopic living donation procedure of the left kidney, combined spinal and epidural anesthesia was applied in the recipient. On L4-5 level an epidural catheter was placed and on the same level 3 mL bupivacaine (5 mg/cc heavy spinal) anesthesia was given, with a sensible block until Th10. Epidural anesthesia was established with 14 mL ropivacaine (7.5 mg/cc) for 1.5 hours; eventually a sensible block from Th8 to Th12 was achieved. During the operation the patient was sedated with 1 μg/kg/h of dexmedetomidine.

A small Gibson incision was made on the right side and the donor kidney was placed in the right iliac fossa (Fig. 1A). The renal vein was anastomosed to the external iliac vein, whereas the renal artery was anastomosed end to side to the external iliac artery. The anastomosis time for both anastomoses was 18 minutes. The method used to establish urinary continuity was an extravesical ureteroneocystostomy according to Lich-Gregoir, without external or internal stenting (Fig. 1B). The abdominal wall was closed in layers according to normal protocol. During the entire procedure, the patient experienced no discomfort or pain. Closure of the skin was done with staples according to the advice of the Center for Blistering Diseases, and the skin was carefully dressed with Mepitac. During the procedure his blood pressure never dropped below 130/75 mm Hg.

The patient had an uneventful postoperative course without any new skin lesions, and was maintained on prednisolone, tacrolimus, and mycophenolate mofetil (Fig. 1C).

One day after surgery the epidural catheter was removed. The postoperative pain score was 2 or lower. Seven days after the kidney transplantation he was discharged in good clinical condition with a stable creatinine level around 90 μmol/L. In 2017 he was admitted due to blisters in his mouth, leading to dysphagia. He recovered with conservative therapy and was discharged after a few days. Three years after kidney transplantation his creatinine levels are still stable around 91 μmol/L.

**DISCUSSION**

DEB can be associated with a dominant or recessive inheritance. The recessive subtype may present itself with a mild or severe clinical presentation. Severe RDEB usually starts at birth with spontaneous blister formation or lesions caused by minimal trauma, both in skin and mucosa. The most overwhelming consequence is the excessive scarring of the extremities [3].

Renal failure is a serious complication of severe generalized RDEB and rarely occurs in patients with junctional epidermolysis bullosa or mild RDEB. Kidney failure can be caused by ureter obstruction or by glomerular diseases [4]. Our case with IgA glomerulonephritis is less common, and is possibly caused because of recurring infections of skin lesions [5]. Renal failure is an important cause of death in RDEB patients [6].

All treatment options for end-stage renal disease in EB patients have been described. The preferred treatment is hemodialysis instead of peritoneal dialysis because of increased risk of extensive intra-abdominal fibrosis. However, hemodialysis is still not convenient for RDEB patients because of multiple infusions, fragile skin, and medical adhesives. Kidney transplantation is being questioned as an effective treatment owing to a lack of literature, surgical complications and choice of immunosuppressive therapy [4,7]. Only 1 case report of kidney transplantation in a patient with EB has been published. This patient with Non-Herlitz junctional epidermolysis bullosa (NH-JEB) developed a severe IgAN and was initially treated with hemodialysis. After successfully undergoing a cadaveric kidney transplantation his renal function returned to normal [8].

There is limited literature available about the impact of immunosuppression on the disease program [7]. However,
treated with tacrolimus and mycophenolate mofetil without prednisolone usage had a positive effect on the skin.

Our patient was admitted in 2017 because of dysphagia, owing to blisters in his mouth. This event supported the thought of not intubating the patient during surgery. The combination of spinal and epidural anesthesia does not affect the outcome of a kidney transplantation compared with general anesthesia [9]. However, this procedure is not standardized and blood pressure monitoring is essential to prevent low blood pressure. The combination of a spinal and epidural turned out to be a great solution for patients with intubation problems.

During the kidney transplantation, we were aware of potential risks such as sepsis and perioperative or anesthetic complications, which fortunately did not occur. Optimal teamwork and communication between different consultants and hospitals with careful planning of the pre- and postoperative policy have substantially decreased these surgical and anesthetic complications. This all led to an uneventful postoperative course, despite the patient having a severe form of generalized RDEB. We therefore think that this case can be extrapolated to other patients with this diagnosis. Living kidney transplantation has the benefit of avoiding dialysis and is not limited by the availability of deceased donor organs.

In conclusion, this case shows that living kidney transplantation is a feasible option for patients with EB and end-stage renal failure to improve survival, their quality of life, and to diminish dialysis-related morbidity and mortality. Intubation should be avoided due to possible blister forming in the trachea, and a combination of spinal and epidural anesthesia forms an ideal solution.

REFERENCES