



# De novo multiple food allergy after liver transplantation: A case report

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## Abstract

### *De novo multiple food allergy after liver transplantation: A case report*

Food allergy is defined as an immune-mediated response to food. Food allergy after solid organ transplantation was first described in 1997 after liver and kidney transplantation. Three years- five-month-old male was admitted with lip swelling after food intake. He had received a liver transplant from a living donor at ten months of age due to biliary atresia. Treatment with tacrolimus and mycophenolate mofetil was monitored. He was admitted to the emergency department with complaints of lip swelling that developed immediately after eating eggs in our department at 20 months of age. No associated respiratory, skin or gastrointestinal findings were noted in the case, who had previously eaten eggs without any problems. Later, after eating honey and tahini mixture and corn with mayonnaise sauce at different times, swelling developed on his lips and eyes. According to the tests, eggs, peanuts, and hazelnuts were excluded from the patient's diet. The case was followed with diet therapy for two years with no problems. Organ donors should be screened for food allergies to predict organ recipients' risk for new food allergies after transplantation. Although there is no evidence of food allergy in the donor, it should be kept in mind that new food allergies may develop in patients who have undergone solid organ transplantation, and patients should be monitored in this regard.

**Keywords:** Liver Transplantation, Tacrolimus, Multiple Food Allergy, Child

## Öz

### *Karaciğer transplantasyonu sonrası de nova çoklu besin alerjisi gelişen olgu*

Gıda alerjisi, gıdaya karşı bağışıklık aracılı bir yanıt olarak tanımlanır. Katı organ nakli sonrası gıda alerjisi ilk kez 1997 yılında karaciğer ve böbrek naklinden sonra tanımlanmıştır. Burada 10 aylıkken biliyer atrezi nedeniyle anneden karaciğer transplantasyonu yapılan ve 3 yaşında çoklu gıda alerjisi saptanan olgu sunulmuştur. 3 yaş 5 aylık erkek olgu, gıda alımı sonrası gelişen dudakta şişlik yakınması nedeniyle başvurdu. 10 aylıkken biliyer atrezi nedeniyle anneden karaciğer transplantasyonu olan olgu takrolimus ve mikofenolat mofetil tedavilerini düzenli olarak kullanmaktaydı. 20 aylıkken yumurta yedikten 5 dakika sonra gelişen dudakta şişlik yakınması ile acil servise başvurmuş. Daha önce yumurtayı sorunsuz olarak tüketebiliyormuş. Bu sırada solunum, deri veya gastrointestinal sisteme ait bulgular eşlik etmemiş. Daha sonra farklı zamanlarda bal tahin karışımı, mayonez soslu mısır tükettikten sonra da dudak ve gözlerinde şişlik gelişmiş. Testlere göre yumurta, fıstık ve fındık hastanın diyetinden çıkarıldı. Olgu 2 yıl diyet tedavisi ile sorunsuz takip edildi. Organ alıcılarının nakil sonrası yeni gıda alerjileri riskini tahmin etmek için organ bağışçıları gıda alerjileri açısından taranmalıdır. Donörde herhangi bir besin alerjisine dair kanıt bulunmamakla birlikte solid organ nakli yapılan hastalarda yeni besin alerjisi gelişebileceği akıld tutulmalı ve hastaların bu konuda takip edilmesi gerekmektedir.

**Anahtar Kelimeler:** Karaciğer Nakli, Takrolimus, Çoklu Gıda Alerjisi, Çocuk

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## INTRODUCTION

In 1997, the first two case reports of food allergy after solid organ transplantation were published. The first case report involved an adult donor who died of anaphylaxis due to peanut allergy, and the liver and kidney transplant recipients subsequently developed peanut allergy. The case was also notable because a second recipient who received the pancreas and another kidney did not develop a food allergy, despite having the same donor (1). The second case report involved a seven-month-old child who developed a milk allergy after receiving a live liver transplant from her father, who had no history of food allergy (2). These two cases illustrate how diverse the manifestations of food allergy are.

New-onset food allergies are increasingly reported after liver transplantation in children (3-5). To date, the underlying physio pathologic mechanism is incompletely understood. Tacrolimus-based maintenance immunosuppression, which is commonly used in pediatric solid organ transplantation, appears to play a role by causing a shift toward T helper 2 cells. Eosinophilia and other allergic manifestations are also more common in other solid organ transplant recipients who do not have a liver and are treated with tacrolimus (6). However, food allergies are observed mainly after liver transplantation (7). This finding suggests that tacrolimus is not the only predisposing factor for the development of food allergy and supports the role of the liver in the development of immune tolerance.

In this case report, we present a case of multiple food allergies after liver transplantation. Informed consent was obtained from the case's parents to conduct this study, and the rules of the Declaration of Helsinki were followed.

## CASE

A male infant who had conjugated hyperbilirubinemia at three weeks of age was diagnosed with biliary atresia. The Kasai procedure was performed at 8 weeks of age and resulted in partial drainage. The patient, who received a liver transplant from a living donor at 10 months of age because of biliary atresia, was followed up in our department with tacrolimus and mycophenolate mofetil without any problems.

At 20 months of age, he sought emergency services because he complained of swelling of the lip that developed immediately after eating an egg. No angioedema, respiratory, or intestinal symptoms occurred. He was treated with an antihistaminic, and symptoms resolved within 2 hours. No further symptoms were noted in the patient, who had previously consumed egg without problems. Later, after he ate a mixture of honey, tahini, and corn with mayonnaise sauce at various times, swelling of the lips and eyes occurred. He was treated with an antihistaminic. No angioedema, respiratory or intestinal symptoms occurred.

The patient was a term infant, weighed 2970 g, and had a history of cesarean deliveries. There was no evidence of atopic disease in his family history. On physical examination of the patient, body weight: was 14.5 kg (25p), height: was 97 cm (22p), and the liver was palpated in the midline of the abdomen; other systemic examinations were normal.

Laboratory results of the case were determined as follows: Hgb: 10.3 g/dL, WBC: 5100 u/L, ANS: 2300 u/L, ALS: 2300 u/L, Eos: 4.6%, Eos#: 200u/L, Plt: 240.000 u/ L, Specific IgE FX5: 10.3 kU/L, Specific IgE egg yolk: 10.6 kU/L, egg white: 20.6 kU/L, milk: 1.35 kU/L, FX (seafood): < 0.1 kU/L. Specific IgE FX5: 10.3 (0.35) kU/L, Specific IgE egg yolk: 10.6(0.35) kU/L, egg white: 20.6 (0.35) kU/L, milk: 1.35 (0.35) kU/L was detected. In Skin Prick Test; tests with epidermal standard solutions were considered positive >3 mm. Cow milk: negative, egg white: 5 mm, egg yolk: 3 mm, wheat flour: 2 mm, prick to prick (ptp) cow milk: 4 mm, egg white: 7 mm, egg yolk: 2 mm, nuts: 7 mm, peanut: 8 mm was observed. Eggs, peanuts and hazelnuts were excluded from the patient's diet. He had no history of reactions to milk and wheat and consumed these products. He was not recommended a diet with milk and wheat products.

## DISCUSSION

Food allergies acquired by transplantation often occur in children who have not had food allergies in the past. This is commonly reported after liver transplantation. The risk of developing food allergy after liver transplantation was reported to be 4-38% in one case series (8). Multiple food allergies frequently develop. Calcineurin inhibitors (especially tacrolimus) have been implicated in the pathogenesis but are considered only one of many factors. Today, two mechanisms have come to the fore. The first is a passive transfer of donor food allergy to the organ recipient (transfer of donor IgE or lymphocytes); the second is a new food allergy that develops as a result of loss of tolerance to the food antigen. The mechanism of the development of a new food allergy is not fully understood.

Most food allergies that develop after liver transplantation are observed in the group of patients with liver transplantation in infancy (5). Wisniewski et al. showed that the risk of food allergy is higher when liver transplantation was performed before the second year of life (9). Our case received a liver transplant from his mother when he was ten months old, as described in the literature, and he had no history of food allergy.

The most common foods after liver transplantation were eggs, milk, and wheat (9). Skin rashes were most commonly observed with food allergies but were also associated with vomiting and diarrhoea (10). Eosinophilia and high IgE levels were also noted in these patients (10). In our case, the skin

findings developed after eating an egg. He also had peripheral eosinophilia and his total IgE was high.

Mavroudi et al. reported that tolerance to milk developed after two years in two of the three patients who developed milk allergy after liver transplantation and after eight years in the other case (11). Our case was followed for 21 months since diagnosis, and tolerance has not yet developed.

Consequently, a food allergy may occur after liver transplantation. The infant age group is particularly at risk. Organ donors should be screened for food allergies to predict the risk of organ recipients developing new food allergies after transplantation. Even if there is no evidence of food allergy in the donor, it should be kept in mind that new food allergies may develop in patients who have undergone solid organ transplantation, and patients should be monitored in this regard.

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### Conflict of Interest

The authors declare that they have no conflict of interests regarding content of this article.

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### Ethical Declaration

Informed consent was obtained from parents of the participant and Helsinki Declaration rules were followed to conduct this study.

### Authorship Contributions

Concept: YÖ, Design: YÖ, Supervising: SKÇ, Financing and equipment: None, Data collection and entry: GŞ, Analysis and interpretation: GŞ, Literature search: SKÇ, Writing: GŞ

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