The Application of Cryopreserved Osteochondral Allograft after Resection of Middle Facet Talocalcaneal Coalition

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ABSTRACT

Talocalcaneal coalition is the most common tarsal coalition, and the middle facet is the most common location of the talocalcaneal coalition. Resection of the coalition has been recommended for patients having mild or moderate degenerative changes in the surrounding joints. Interposition of various materials has been presented after coalition to prevent coalition reformation, adipose tissue, bone wax, superficial fascia, flexor hallucis longus tendon, and tensor fascia lata. However, each of the interposition materials have their disadvantages. This case series presents several cases of the resection of talocalcaneal coalition and the application of the cryopreserved osteochondral allograft as the interposition graft.

INTRODUCTION

Tarsal coalitions were first described in 1769 by Buffon (1). A tarsal coalition represents a failed segmentation between the joints of tarsal bones. The most common tarsal coalition joint is the calcaneonavicular joint followed by the talo-calcaneal joint. Together, these two joints contribute to 90% of all cases of tarsal coalition (2). The talocalcaneal coalition has two forms, either articular or peripheral. In the articular form, the middle facet of the subtalar joint is the most commonly involved (3). Talocalcaneal coalition typically presents at 12 to 16 years old. In general, if degenerative changes are present in the talocalcaneal joint, surrounding joints, or if a coalition involves >50% of the joint surface, arthrosis is the recommended operative approach (4) or else resection of the coalition and the interposition of spacers are recommended. Resection of the coalition helps to normalize foot mechanics (5) and increase the range of motion of the hindfoot increased significantly, which allows a corrective medial arch support, rather than an accommodative one (1). It has been proposed to utilize different interpositional spacers after the resection of the coalition to prevent the reformation of the coalition.

The focus of this study is the result of the resection of talocalcaneal coalition and the utilization of cryopreserved osteochondral allograft as the interposition graft.

METHODS

3 patients with middle facet talocalcaneal coalition undergoing coalition resection and the application of cryopreserved osteochondral are included in the study. 2 patients had adjunct procedures in addition to the coalition resection.

RESULTS

Different materials have been interposed between the two bones to minimize the risk of TC relapse after the coalition resection. Bone wax, autologous fat tissue, iliotibial band graft, pediculated flap of TP tendon sheath, pedicle fatty flap of subcutaneous fat, or split-tendon of the flexor hallucis longus tenued to the peristeme, are traditional interposition materials (4). However, the risk of dislocation of the autologous fat tissue (6) or the occurrence of fat necrosis had been reported (7). The success of the pedicle fatty flap of subcutaneous fat can be limited by the volume of the subcutaneous fat and the skin may necrotic due to skin thinning after the pedicle fatty flap was obtained (8). One can weaken the active motion of the flexor hallucis longus tendon and cause the rupture of flexor hallucis longus tendon which leads to hallux deformity by using a split graft of flexor hallucis longus tendon (6) as an interposition material. The use of Juvenile hyaline cartilaginous allografts may have the risk of postoperative partial or fully delamination, host rejection, or infectious disease transmission.

ProChondrix CR (ProChondrix, AllSource, Centennial, CO) is a thin, living cell, intact, and cryopreserved fresh cartilage matrix from cadaveric adult donors. Prochondrix not only provides the scaffold for cells migration, it also contains chondrocytes and osteoblasts, and native growth factors (bFGF, PRG4, TGF-B1, BMP-2, and PDGF). Osteochondral allograft can restore true type II hyaline cartilage. Its avascular and aneural nature provide its relatively immunologically inactive and privileged by embedding chondrocytes in the extracellular matrix and shielding them from recipients’ immune cells (9). Deep side of the graft undergoes laser perforation to enhance cell signaling and chondrocyte migration. ProChondrix has been reported in repairing OCD lesion of the talus (10). However, we believe this is the first paper to present a novel procedure with the use of cryopreserved osteochondral cartilage to act as an interpositional spacer after the resection of tarsal coalition. This new technique by interposition of osteochondral allograft after resection of the talocalcaneal middle facet coalition shows positive short-term outcomes.

REFERENCES


DISCLOSURES

We have no financial disclosure.

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