The outcome of “cross-coupling suture button suspensionplasty” for thumb carpometacarpal joint osteoarthritis - a case series-

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【Introduction】
- Although thumb carpometacarpal (CMC) joint osteoarthritis (OA) is a common, disabling condition that mostly affects women.
- Thumb CMC joint OA is initially treated nonsurgically. When these conservative treatments have failed, surgery is considered.

Surgical procedure
arthroplasty
trapeziectomy + ligament reconstruction and tendon interposition (LRTI)
arthrodesis
prosthesis
suture button suspensionplasty (SBS)

We have developed a novel SBS called “cross-coupling suture button suspensionplasty (CC-SBS)” using a pair of suture button devices after a complete trapeziectomy.

We report the short-term clinical results of patients who underwent CC-SBS at our institution.

【Surgical technique of CC-SBS】
Open trapeziectomy may be performed from the dorsal-radial direction with a Y-shaped incision on annular subchondral bone.
The trapezium is exposed with subperiosteal dissection and excised en bloc or piece by piece.
The first metacarpal is retracted distally to make a symmetrical "U" shape between the unique cortical line of the first metacarpal and the radial cortical line of the second metacarpal.
The guide pin "A" is inserted at the proximal edge (permissible at the CMC joint surface) of the first metacarpal and pierced to the proximal third of the shaft of the second metacarpal. The guide pin "B" is inserted at the base of the first metacarpal and pierced to the base of the second metacarpal. A pair of sutures of Mini TightRope® is passed from the first metacarpal to the second metacarpal by extracting guide pins.
First, the anchor button "A" is fixed on the second metacarpal with appropriate tension to maintain the U shape between the cortical lines of the first and second metacarpals.
Second, the anchor button "B" is fixed in similar manner. However, excessive tension should be avoided because of impingement between the base of the first and second metacarpals.

【Postoperative care】
We apply abduction short thumb spica cast from the forearm to the base of the thumb during the first week of the operation. Gentle hand movement, excluding the involved thumb, and active finger motion are encouraged if pain allows. During the casting period, ROM exercises of the interphalangeal joint are initiated. A custom-made removable thumb spica splint is applied to allow for early motion and gentle progressive abduction of the thumb. We use the thumb and pinch exercises when performing activities of daily living (ADL) 2 weeks after the operation when the surgical wound pain is relieved. The splint is removed at 4 weeks. Thereafter, all subjects can use their hands as needed for convenience on their ADL.

Results: Patients, procedures, and outcomes

<table>
<thead>
<tr>
<th>Patients</th>
<th>Gender</th>
<th>Age</th>
<th>Trapeziectomy</th>
<th>Operated site</th>
<th>Preoperative Eaton stage</th>
<th>Duration of operation (min)</th>
<th>Follow-up (mo)</th>
<th>Post operative (mm)</th>
<th>Pinch (kg)</th>
<th>Range of motion at final visit</th>
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【Discussion】
In this series, CC-SBS showed a similar clinical outcome as LRTI at a short-term evaluation. Our results demonstrate that faster overall recovery through earlier initiation of movement may increase patient satisfaction and enhance quality of life in the short term. Recently, some reports used two sets of Mini TightRope®. The main advantage of CC-SBS is that strength can be reliably maintained compared with SBS using single SB device, because the first SB device pulls up the first metacarpal; thus, the second SB device is pulled over it. In addition, the CC-SBS has some advantages. First, it does not need a donor tendon for suspension, and it is technically simple and less invasive compared to LRTI. Second, patients can start rehabilitation immediately after surgery due to its rigid initial stability. However, there are so many reports of CC-SBS at our institution. Although Yao et al. reported 5-year follow-up for SBS, the long-term outcome of CC-SBS is not yet known. However, this series and other reports demonstrated good short-term results. Therefore, we recognize that CC-SBS is a good surgical option for CMC joint OA.
In the future, long-term follow-up of CC-SBS performed in many patients to confirm its good outcomes is anticipated.

References:

Conflict of interest statement: The authors declare that they have no conflict of interest.

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