Case Report

The story of pollicization

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Abstract
Pollicization is the most reported reconstructive procedures after traumatic amputation together with toe to thumb transfer, and osteoplastic thumb reconstruction (1). We reported a 27 years old man with gangrene of the left thumb, who has crippled right hand following cerebral palsy since birth. Pollicization of his right index finger was done with excellent functional outcome after 9 months of follow-up.

Keywords: Pollicization, thumb reconstruction, index, gangrene.

Introduction:
Pollicization is the most reported reconstructive procedures after traumatic amputation (1).

Indications for pollicization as follows:
1) Isolated amputation of the thumb at the level of the metacarpophalangeal joint or at the level of carpometacarpal joint (3,4).
2) Congenital aplasia or hypoplasia of the thumb (3).
3) Inoperable radial club hand (5).
4) Malignant tumour (6).

Case report
A 27 years old man from Atbara, Sudan presented with dry gangrene of the left thumb and middle and distal phalanges of the left index fingers seven days after intra-arterial injection of the left radial artery mistaken as intravenous injection. The patient is known case of cerebral palsy with spastic paralysis of the right upper limb.

On examination the left radial pulse at the wrist was absent. The left thumb with the middle and distal phalanges of the left index showed dry gangrene with clear demarcation, (Fig 1).

Fig 1: Showing gangrene of the whole left thumb with gangrene of distal and middle phalanx of left index finger.

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Other parts of the body is normal apart from spastic paralyzed upper limb with fixed flexion deformity of the elbow & wrist joint on the right side with disuse atrophy of the hand forearm and upper arm.

The patient was investigated and the family was counseled for pollicization of the left index finger. High risk consent was taken. The patient was taken to the theatre. Amputation of the left thumb at metacarpophalangeal joint was done. Amputation of both middle and distal phalanges of the left index was also performed (Fig 2).

Procedures done (Fig 3):

- Incision around the index finger at the level of the proximal phalanx and formation of a skin flap with a palmar base.
- Dissection and mobilization of veins and nerve branches at the extensor side, proximal transection of the extensor tendons of the index finger.
- Dissection of nerves and vessels at the flexor side. Interfascicular splitting of the common palmar nerve II/III.
- Opening of the flexor tendon sheath up to the mid-part of the proximal phalanx. Transposition of the index finger maintaining the continuity of flexor tendons, palmar nerves, ulnar digital artery and posterior nerves and veins.
- Internal fixation between first metacarpal and proximal phalanx of index finger, sutures uniting the extensor tendons of the thumb and extensor tendons of index finger.
- Post operative course was uneventful.

Justification of procedure

We have offered this patient this operation because his left hand is dominant for him, he was having crippled right hand following cerebral palsy. He used to use his left hand as dominant one and the thumb is almost 50% of the function of the hand. We have offered him this procedure to help him use his left hand as usual before gangrene of his left thumb.

Discussion

We favored pollicization of the index finger over the transfer of a second toe because of the anatomical situation. In index finger pollicization all the present blood vessels, nerves and muscles can be used. If a toe was transferred it can be difficult to find equal structures for anastomosis of the vessels, tendons and coaptation of nerves. In Pollicization of the index finger sensibility remains intact near normal. All these factors made us to do pollicization rather than toe transfer.

Mile stones of pollicization

In the early fifties Osset, Hilgenfeldt, and Littler who developed fundamental principles for pollicization in cases of aplasia and hypoplasia of the thumb. Other authors such
as Harrison and Riordan have also made important contributions. The high incidence of congenital malformations of the thumb in the years from 1959 to 1962 mostly resulting from the thalidomide tragedy has led to a widespread interest in their surgical treatment. The progress in the field of surgery of the hand led to technical modifications of previously used procedures for Pollicization, and better results followed. Dieter Buck-Gramcko (from Germany) during 1959 to 1971 had performed 114 pollicization operations.

We prepared the patient with simple investigations like haemoglobin and urine analysis because obviously it was gangrene of the thumb although recently CT angiography may be used preoperatively, but we had not done it. CT angiography can show bones, tendons and blood vessels three-dimensionally. It is a relatively new but invasive technique. However, it can be less invasive if the contrast agent is introduced via a peripheral vein instead of an arterial catheter. The exposition towards X-rays is four times lower than with regular angiography.

For creation of a well-functioning and nearly normal appearing thumb various methods have been proposed. The most commonly performed technique is the transposition of the index finger described by Buck-Gramcko.

A good result, however, requires that one use a refined technique. For the pollicization operation there are four basic principles of equal importance, relating to the following: (a) the neurovascular pedicle; (b) the skeletal readjustment with reservation of the metacarpophalangeal joint; (c) the muscular stabilization; (d) The skin incision.

We did for this patient in steps the usual technique of pollicization which led to reasonable outcome after surgery. For muscle stabilization, the adjustment of the extensor tendons and the mechanism is one of the most important steps of the operation. The muscles and the long extensor and flexor tendons are responsible not only for the mobility, but also for the stability of the digit.

Some plastic surgeons do this kind of operation in staged procedure with preliminary application of a pedicle flap, and a normal index finger transposition, followed by opposition transfer using the abductor digit quinti muscle twenty-seven months after the index finger pollicization.

The postoperative follow-up lies between 1 and 10 years (on average 4.5). Our patient is being followed-up for 9 months and this is the period from the time of operation up to date. Although there are many approaches toward assessing the outcome of pollicization surgery the best is the method of Percival because it is simple and judges the function, mobility, sensibility and cosmetic aspects.

In conclusion, before selecting a candidate for thumb reconstruction, it is critical to decide on an individualized treatment plan. Factors such as the patient's occupation and the importance of the aesthetic appearance of the thumb must be carefully considered. The surgeon must investigate the patient's current use pattern and functional requirements before considering a reconstructive treat

References


