Kirschner wires: a novel technique to assist abdominal closure utilising the viscoelastic properties of skin

Dear Sir:

Abdominal wall closure following deep inferior epigastric artery perforator (DIEP) flap harvest often requires flexion of the operating table at the level of the patient's hips in addition to undermining of the superior flap to aid closure. During closure, the skin flaps are elongated through the stretching of collagen fibres, breaking of elastin and displacement of water.1,2 We describe a technique that uses towel clips and K wires, improvised from a device previously reported by Hirshowitz et al3 which harnesses the phenomenon of mechanical creep. This technique allows wound closure in difficult cases, without the need for table manipulation or consideration of alternative reconstruction options.

Technique

Following lower abdominal flap harvest, the superior abdominal skin flap is undermined to the costal margins and xiphisternum (see Figure 1). If the donor site closure is too tight to allow closure, the following technique is employed.

Four 2.7 mm single trocar K-wires, two in parallel on each side of the wound, are longitudinally ‘weaved’ into the dermis 1 cm behind each wound margin. Each K-wire undergoes two passes out of the tissue exposing wires for application of towel clips or bone reduction forceps. The towel clips are hooked onto opposing exposed wires and left open (Figure 2), bridging the gap between wound margins. The finger holes of the medial towel clips are hooked by further towel clips, which are closed to further draw the wound edges together (Figure 3). After five minutes, all the attached towel clips are closed and left in this position for at least twenty minutes whilst the Scarpa’s fascia and dermis are sutured in the lateral extremes of the wound (Figure 4). Further Scarpa’s and dermal sutures are
Discussion

The K-wires form opposing bars, which enable the spread of tension along the wound during application of the towel clips. The illustrated example, where the apparatus was removed in order to measure the extent of mechanical creep, showed a reduction of the longitudinal wound extent from 14 cm to 9 cm. At no point did the surrounding skin blanch during this process, nor was the table flexed at the hips. This has been an effective tool used on well over 100 DIEP flap patients with no specific identifiable complications. By utilising this simple method of wound edge apposition which manipulates the viscoelastic properties of skin, difficult wounds can be approximated without the need for consideration of alternative techniques, such as table manipulation, additional equipment or the need for local flaps or grafting to achieve closure.

Conflict of interest/funding

None.

References


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