Keystone design perforator island flap

Many repair techniques have been proposed to treat large myelomeningocele (MMC), and although effective in many cases, some of these techniques can be complex and time consuming, with complications such as cerebrospinal fluid leakage, flap loss, tip necrosis, and wound dehiscence. The purpose of this study was to analyze cases of large skin defects and the methods applied and to report the outcomes of the keystone design perforator island flap (KDPIF) technique for large MMC closure.

The authors performed a retrospective review of all neonatal patients who had undergone KDPIF for MMC closure in the period from 2013 to 2018. All patients had a diagnosis of lumbosacral MMC based on obstetric ultrasound. The neurosurgeons and plastic surgeons had selected the cases after concluding that primary closure would be unlikely. The design of the flap is based on the randomly located vascular perforators, creating two identical opposing flaps to fashion a double keystone flap. During wound closure, V-Y advancement of each end of the double flap in the longitudinal axis creates redundancy in the central portion of the flap and reduces the horizontal tension. After discharge, both the neurosurgery and plastic surgery teams followed up all patients, tracking the results with photography.

No skin flap dehiscence or necrosis, infection, or CSF leakage was detected, proving the reliability of the flap. One of the patients required further surgery for the large skin defects after insufficient intrauterine closure of the MMC and successfully underwent KDPIF treatment. Another patient (14.3%) had severe neonatal sepsis, which ultimately led to death. A ventriculoperitoneal shunt was required after the skin defect repair in 5 (83.3%) of the 6 surviving patients. Exceptional aesthetic results were achieved for all patients during the follow-up.

The KDPIF technique is based on well-known vascular perforators of the intercostal, lumbar, and gluteal regions. Wound tension is widely distributed by the flap and, as a consequence, relevant tissue bulk, reliable vascularity, and important geometrical versatility are provided. In addition, most of the muscles and fascia are preserved, which is another advantage in terms of minimizing secondary morbidity to local tissue rearrangement. The use of KDPIF closure was successfully shown to be a viable alternative for more complex MMCs that present with large skin defects [1)].

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