Improvement of the tissue-adhesive and sealing effect of fibrin sealant using polyglycolic acid felt.

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Abstract:

Although fibrin sealant (FS) has an advantage of high biocompatibility, its adhesive force and sealing effect have been generally considered to be inadequate. In the present study, a high adhesive force and sealing effect were obtained by first rubbing fibrinogen solution into the target tissue, attaching polyglycolic acid (PGA) felt to the treated area, and finally spraying it with FS. This method was compared with three conventional FS application methods and a method using fibrin glue-coated collagen fleece. The adhesive force resulting from the present method was 12 times higher than that for the sequential application method, 4.5 times higher than the spray method, 2.5 times higher than the rubbing and spray method, and 2.2 times higher than the use of fibrin glue-coated collagen fleece. The high adhesive force of FS with PGA felt seemed to be due the high fibrin content of the fibrin gel (FG). Light and electron microscopic observations suggested that the formation of FG in closer contact with the muscle fibers was a factor contributing to this superior adhesive force. Comparison of the sealing effect of the present method with other methods using various biomaterials in combination with FS showed that the sealing effect of FS with PGA felt was 1.4 times higher that of polyglactin 910, 1.8 times that of polytetrafluoroethylene, and 6.7 times that of oxidized regenerated cellulose.