Aim: Background: Surgical mesh is widely used not only to treat but also to prevent incisional hernia formation. Despite much effort by material engineers, the ‘ideal’ mesh mechanically, biologically and surgically easy to use remains elusive. Advances in tissue engineering and nanomedicine have allowed new concepts to be tested with promising results in both small and large animals. Abandoning the concept of a pre-formed mesh completely for a ‘pour in liquid mesh’ has never been tested before.

Material and Methods: Thirty rabbits underwent midline laparotomy with closure using an absorbable suture and small stitch small bites technique. In addition, their abdominal wall closure was reinforced by a liquid nanofibrous scaffold composed of a fibrin sealant and nanofibers of poly-ε-caprolactone with or without hyaluronic acid or the sealant alone, placed as an ‘onlay’ over the closed abdominal wall. The animals were sacrificed at 6 weeks and their abdominal wall was subjected to histological and biomechanical evaluations.

Results: All the animals survived the study period with no major complication. Histological evaluation showed an eosinophilic infiltration in all groups and foreign body reaction more pronounced in the groups with nanofibers. Biomechanical testing demonstrated that groups treated with nanofibers developed a scar with higher tensile ultimate and yield strength.

Conclusions: The use of nanofibers in a liquid form applied to the closed abdominal wall is easy to use and improves the biomechanical properties of healing fascia at 6 weeks after midline laparotomy in a rabbit model.