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Titel des Beitrags: Prediction of flap necrosis with laser induced indocyanine green fluorescence in a rat model.

Abstract: Prediction of necrosis has a clinical relevance in all fields of plastic surgery. The new application of indocyanine green (ICG) fluoroscopy in plastic surgery allows an objective quantification of skin perfusion and a high topographical resolution. The aim of the present study is to determine threshold values for flap perfusion under well-defined experimental conditions. Twenty random pattern flaps with a length to width ratio of 4:1 (8 x 2 cm\(^2\)) were dissected on the anterior abdominal wall of 20 male Sprague-Dawley rats. ICG fluoroscopy was performed at the end of the operation. The animals were sacrificed at the seventh postoperative day with a reliable necrosis of the distal part of the flaps. Postoperative ICG fluoroscopy then was analysed both in regions that will survive and undergo necrosis. At day 7 a mean area of 5.5 cm\(^2\) (57% of the total flap area) survived and a mean of 3.8 cm\(^2\) (43%) became necrotic. The surviving part of the flap had a mean perfusion index of 62% compared to reference skin. The distal parts of the flap that necrotised showed an average perfusion index of only 19% postoperatively. Differences were statistically highly significant (p<0.001). Indocyanine green fluoroscopy is a useful tool to evaluate perfusion topographically and predict necrosis. From a statistical point of view a perfusion index of less than 25% of the reference skin can be considered as a sign of developing necrosis.
flap necrosis.

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