OBJECTIVE: To investigate the effect of three types of peritoneal trauma occurring during surgery (high-frequency bipolar current, suturing, and mechanical damage) on postoperative adhesion formation in a rodent animal model. DESIGN: Randomized, controlled experimental trial in an in vitro animal model.SETTING: Laboratory facilities of a university department of obstetrics and gynecology. ANIMAL(S): Thirty-five female Wistar rats. INTERVENTION(S): Bilateral experimental lesions were created on the abdominal wall in every animal. The effect of minimal electrocoagulation was examined by creating lesions (n = 14) through sweeps of a bipolar forceps with a duration of 1 second and standardized pressure. For extensive electrocoagulation standardized lesions (n = 14) were created using sweeps of a duration of 3 seconds and three times more pressure. For mechanical trauma, standardized lesions (n = 14) were created by denuding the peritoneum mechanically. To study the additive effect of suturing, experimental lesions were created by suturing plus minimal electrocoagulation (n = 14) or mechanical denuding (n = 14). MAIN OUTCOME MEASURE(S): Adhesion incidence, quantity, and quality of the resulting adhesions were scored 14 days postoperatively. Adhesions were studied histopathologically. RESULT(S): Mechanical denuding of
the peritoneum did not result in adhesion formation. After minimal electrocoagulation, mean adhesion quantity of the traumatized area averaged 0%. This contrasted with extensive electrocoagulation, where there was 50% adhesion. Additional suturing increased mean adhesion quantity to 73% and 64% for superficial electrocoagulation and mechanical denuding, respectively. CONCLUSION(S): We conclude that superficial trauma limited mostly to the parietal peritoneum may be a negligible factor in adhesion formation in this model. This appears to be irrespective of the mode of trauma. However, additional trauma to the underlying tissues, either by deeper electrocoagulation or suturing, leads to significantly increased adhesion formation. These data also show that there is a spectrum of electrocoagulation trauma at the lower end of which there is little adhesion formation.