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Prediction and Management of Surgical Site Infections in Hybrid Vascular Surgery for Peripheral Artery Disease

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Abstract

Objectives: Postoperative complications are an important problem that all surgeons face. Among all possible complications, local and systemic infections are one of the most prevalent postprocedural adverse events. It is difficult to assess whether or not a patient will develop a surgical site infection (SSI), but there are certain basic investigations that can suggest the probability of such an event. We also investigated some clinically assessable signs to help us better predict the occurrence of SSIs. Every bit of information brings us closer to an ideal where we can bring postoperative complications to a minimum. Close examination and attention to detail is crucial in the prediction and prevention of SSIs.

Methods: A multicenter, retrospective and prospective observational study was carried out between 01.01.2019 – 01.09.2021. All adult patients with peripheral artery disease (PAD) who had disabling intermittent claudication or rest pain, were included in this study. We excluded minor or vascular surgery emergencies (ruptured aneurysms, acute ischemia or vascular trauma). We followed the postoperative complications as well as their management with an emphasis on surgical site infections (SSIs). Receiver Operating Characteristic (ROC) curves were used to determine key values of statistical relevance by calculating the Area Under the Curve (AUC). Multivariate analysis was used to assess the statistical relevance of our data.

Results: The study evaluates 128 patients diagnosed with PAD, aged between 47 and 97, with a mean age of 71.26 ± 10.8 years. There were significantly more male than female patients 71.09% vs. 28.91% ($p < 0.01$). All patients were treated using hybrid vascular techniques. All complication rates were recorded but we focused on SSIs, which was the most prevalent complication (25%). C-Reactive Protein with values higher than 5 mg/dl, was confirmed as a positive predictive factor for postoperative surgical site infections (AUC = 0.80). Another positive predictive factor for SSIs is hyperglycemia. Glycemic values higher than 140mg/dl are more frequently associated with postoperative infections ($p = 0.02$), a predictability curve of statistical significance was also obtained (AUC = 0.71). Postoperative SSIs were more prevalent in patients with preoperative distal trophic lesions ($p < 0.01$). The presence of other complications such as edema and lymphoceles were also linked to SSIs ($p < 0.01$). Nevertheless, patients who underwent surgery over negative wound pressure therapy (NWPT) for infection management had significantly shorter hospital stays ($p < 0.01$).

Conclusions: There are multiple clinical or paraclinical predictors of SSIs. The coexistence of several such factors can carry an additional risk of developing a SSI and should be evaluated and controlled separately in the preoperative phase as much as possible. Admission to a diabetes center and regulation of glycemic values prior to elective vascular surgery, for patients who can be surgically postponed is an effective method of preventing infections. Surgical management remains the most reliable form of treatment of SSIs, being the most efficient therapy and offering immediate results, while simultaneously shortening hospital stays.
Key words: hybrid vascular surgery, PAD, SSI, CRP, hyperglycemia