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Review

Efficacy of submucosal epinephrine injection for the prevention of postpolypectomy bleeding: A meta-analysis of randomized controlled studies

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ABSTRACT

Background: Bleeding is the most common major complication following colonoscopic polypectomy. The purpose of this study is to evaluate whether submucosal epinephrine injections could prevent the occurrence of postpolypectomy bleeding.

Method: The dataset was defined by searching PubMed, EMBASE, Google Scholar, and the Cochrane database for appropriate randomized controlled studies published before April 2015. A meta-analysis was conducted to investigate the preventative effect of submucosal epinephrine injection for overall, early, and delayed postpolypectomy bleeding.

Results: The final analysis examined the findings of six studies, with data from 1388 patients. The results demonstrated that prophylactic treatment with epinephrine injection significantly reduced the occurrence of overall (OR = 0.38, 95% CI: 0.21, 0.66; p = 0.0006) and early bleeding (OR = 0.38, 95% CI: 0.20, 0.69; p = 0.002). However, for delayed bleeding complications, epinephrine injections were not found to be any more effective than treatment with saline injection or no injection (OR = 0.45, 95% CI: 0.11, 1.81; p = 0.26). Moreover, for patients with polyps larger than 20 mm, mechanical hemostasis devices (endoloops or clips) were found to be more effective than epinephrine injection in preventing overall bleeding (OR = 0.33, 95% CI: 0.13, 0.87; p = 0.03) and early bleeding (OR = 0.29, 95% CI: 0.08, 1.02; p = 0.05). This was not established for delayed bleeding.

Conclusion: The routine use of prophylaxis submucosal epinephrine injection is safe and beneficial preventing postpolypectomy bleeding.

Contents

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1. Introduction

Colonoscopic polypectomy is an effective technique that has been shown to reduce the incidence of colorectal cancer by 76–90% [1]. While colonoscopic polypectomy is a relatively safe procedure, it has nevertheless been associated with a number of complications, including bleeding, perforation, and postpolypectomy syndrome [2]. Postpolypectomy bleeding is the most common major complication following a colonoscopic polypectomy procedure, with an incidence rate ranging from 0.3 to 6.1% [3].

Precipitating risk factors for postpolypectomy bleeding in patients include old age (>65 years), comorbid diseases (cardiovascular disease, chronic renal disease, and hypertension), anticoagulant use, large polyp size (>10 mm), sessile polyps, pedunculated polyps with a stalk size > 5 mm, polyps located on the right side of the colon, malignant polyps, use of cutting mode in treatment and use of low-volume endoscopists in treatment [4–7].

Various endoscopic techniques have been developed to prevent postpolypectomy bleeding; these include the administration of a submucosal injection with an epinephrine solution (1:10000) in the base of any polyps, argon plasma coagulation, or mechanical hemostasis (using a detachable snare and/or endoscopic clip) [8–10]. The hemostatic effect of epinephrine has been widely demonstrated and it is often used to prevent bleeding following colonic polypectomy and enhancing complete resection, especially in large sessile polyps [11,12].

Although there is evidence from several studies that submucosal epinephrine injections may reduce the risk of postpolypectomy bleeding, the findings of these studies vary. The purpose of this meta-analysis was to analyze whether the routine administration of a submucosal epinephrine injection was effective in preventing the complications, by assessing the occurrence of overall, early, and delayed postpolypectommy bleeding for those who were treated with a prophylactic submucosal epinephrine injection and treated only with saline injections or with no injections at all (control group). We also compared the bleeding outcomes, of patients treated with prophylactic submucosal epinephrine injections with those treated with other mechanical hemostatic methods (mechanical group).

2. Method

2.1. Data sources and search strategies

An electronic search of PubMed, EMBASE, Google Scholar and the Cochrane database was undertaken. The search term “epinephrine injection,” “colonic polyp,” “prevention,” and “postpolypectomy bleeding” were used as keywords to identify all studies published in English before May 2017, that compared either (1) the postpolypectomy outcomes of patients treated with epinephrine injection with those treated with saline injections/no-injections or (2) studies that compared the postpolypectomy outcomes of patients treated with epinephrine injections with those treated with mechanical hemostatic methods.

2.2. Study selection and eligibility criteria

For inclusion in the meta-analysis, all studies had to (1) examine the effectiveness of colonic polypectomy in patients with colonic polyps, (2) use a randomized controlled study design to undertake the assessment, (3) compare the use of submucosal epinephrine injection prophylaxis by comparing a group of patients who had been treated with this method (epinephrine group) with a control group (either patients treated with non-injection/saline injection) or mechanical hemostasis method (mechanical group), (4) examine overall, early, and delayed postpolypectomy bleeding complication.

The following study types were excluded if: (1) non-randomized and non-comparative studies, (2) case reports, (3) letters to the editor, and (4) review articles. Articles that were only available in abstract form were also excluded. The meta-analysis was performed according to the guidelines of Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2009 [13].

2.3. Definitions

Prophylaxis submucosal epinephrine injection prophylaxis treatment was defined as the administration of an injection of a 1:10000 epinephrine solution into the base of a polyp or stalk to create tissue elevation sufficient to perform a polypectomy. Mechanical hemostasis treatment was defined as the use of either a detachable snare (endoloop) placed at the base of the stalk before polypectomy or an endoscopic clip placed at the residual stalk or the closure of the mucosal defect after polypectomy. Postpolypectomy bleeding was defined either as (1) early: occurring either during an endoscopic procedure or immediately after as hematochezia within 24 h or (2) delayed: any bleeding event that occurring between 24 h and 30 days following the polypectomy procedure.

2.4. Statistical analysis

The meta-analysis was performed using Review Manager Software (Revman version 5.2.6) provided by the Cochrane Collaboration (Nordic Cochrane Center, Cochrane Collaboration,