

REVIEW

Mechanical Versus Injection Endoscopic Therapy for Dieulafoy's Lesion: a Systematic Review and Meta-Analysis

Tarek NAHLE^a, Hadi FARHAT^b, Rasha HARB^b, Lynne HOTEIT^c, Issam FASIH^b, Cesar YAGHI^a, Rita SLIM^a

^aGastroenterology-Hepatology Department, Hotel Dieu de France Hospital, Saint Joseph University, Beirut, Lebanon

^bFaculty of Medicine and Medical Sciences, University of Balamand, Beirut, Lebanon

^cFaculty of Medicine, Kharkiv National Medical University, Kharkiv, Ukraine



ABSTRACT

Background: Dieulafoy's lesion is a rare but potentially life-threatening gastrointestinal condition that often requires endoscopic management. However, there is a lack of consensus on the optimal endoscopic intervention for this condition. This meta-analysis aimed to compare the efficacy and safety of endoscopic mechanical interventions versus endoscopic injection interventions in the treatment of Dieulafoy's lesion.

Methods: A systematic literature search was conducted using PubMed, Google Scholar pages 0-20 and Cochrane Library databases to identify relevant studies published up to March 2023. Studies comparing the outcomes of endoscopic mechanical and injection interventions for Dieulafoy's lesion were included. The pooled odds ratio (OR) and 95% confidence interval (CI) were calculated using a random or fixed effects model depending on the heterogeneity I^2 value. A total of seven comparative studies were included in the meta-analysis consisting of three clinical trials and four retrospective studies. The clinical outcomes consisted of the initial hemostasis, as well as adverse events: recurrent bleeding, death and the need for an operation.

Results: It was shown that endoscopic injection therapy was associated with a lower risk of recurrent bleeding in the treatment of Dieulafoy's lesion compared to mechanical therapy (95% CI, OR=0.33 [0.16, 0.69], p -value=0.003). However, there were no significant differences between mechanical and injection techniques in terms of initial hemostasis, death, or need for an operation.

Conclusion: Our findings suggest that injection methods may be preferred over mechanical techniques in the management of Dieulafoy's lesion due to its potential to reduce recurrent bleeding. Although it is a simple and a non-expensive technique, further studies are needed to confirm these findings and evaluate the long-term outcomes of both interventions.

Keywords: Dieulafoy's lesion, gastrointestinal condition, endoscopic management, meta-analysis, endoscopic mechanical interventions, endoscopic injection interventions.

Address for correspondence:

Hadi Farhat

Email: hadifarhatgs@gmail.com

Article received on the 19th of May 2025 and accepted for publication on the 6th of June 2025

INTRODUCTION

Dieulafoy's lesion of the gastrointestinal (GI) tract is an uncommon but highly morbid medical condition (1), predominantly occurring in the proximal part of the stomach (2). It represents around 1% to 2% of acute GI bleeding due to the development of vascular malformations in the gastrointestinal tract (3). It is often asymptomatic unless the mucosa above the vessel erodes and leads to bleeding (4). The clinical manifestations are associated with the depletion of blood volume resulting from either sporadic or significant GI bleeding. First described as an aneurysm in the stomach by Gallard T., in 1884 (5), it was named after the Toulousian surgeon Georges Dieulafoy, who described it as "exulceratio simplex", which means simple ulcer (6). The etiology of this specific lesion is unknown, neither are the bleeding triggering events. However, patients who suffer from Dieulafoy's lesions and have pre-existing conditions like cardiovascular disease, hypertension, chronic kidney disease, diabetes, or alcohol abuse, are commonly observed to experience bleeding and are mainly of male sex (7). Various endoscopic techniques have been used to manage this lesion, including mechanical hemostasis and injection therapy with epinephrine or other agents. Although multiple studies have compared these two techniques, there is still debate about which one is more effective in achieving initial hemostasis, preventing recurrent bleeding and minimizing adverse events such as death and operation. A meta-analysis of the available literature can provide a comprehensive evaluation of the current evidence regarding the comparative effectiveness of mechanical hemostasis and injection therapy in managing Dieulafoy's lesion. The purpose of this meta-analysis is to compare the outcomes of mechanical hemostasis and injection therapy in the management of Dieulafoy's lesion in terms of initial hemostasis, recurrent bleeding, death and operation. □

MATERIAL AND METHODS

The present study was conducted following PRISMA 2020 guidelines. We searched PubMed, Cochrane and Google Scholar (page 1–20) updated to March 2023 for the studies that are qualified for comparing endoscopic mechanical and

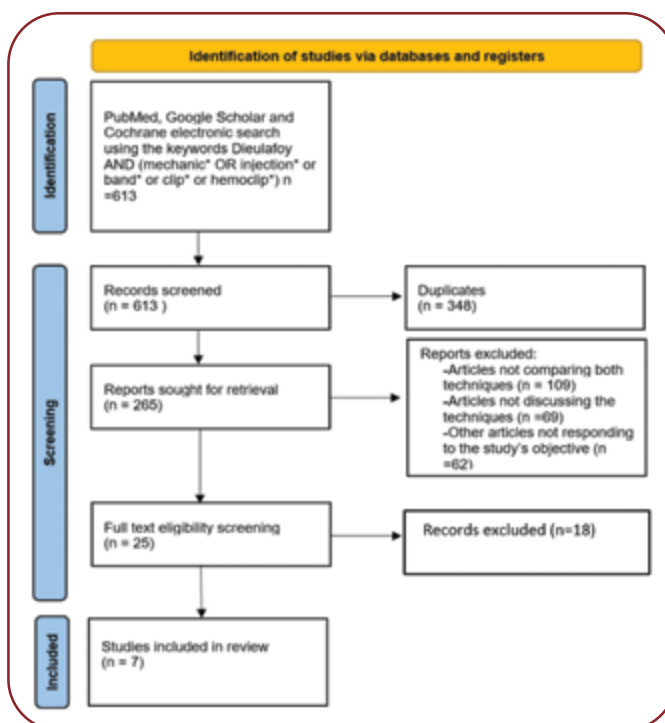


FIGURE 1. Prisma flowchart for the process of article selection

injection therapy for the treatment of Dieulafoy's lesion. Paper reference lists as well as articles related to our pertinent included studies were also used to conduct our research. One investigator (TN) collected and extracted the data and another one (RS) double checked and confirmed the choice of eligible studies. The whole process is summarized in PRISMA flowchart (Figure 1).

Eligibility criteria

We included comparative studies, randomized controlled trials, prospective clinical trials and retrospective comparative studies, as well as studies regarding patients diagnosed with Dieulafoy's lesion and endoscopic treatment with injection compared to that with mechanical hemostatic methods. Only publications available in English or French were selected for our systematic review and meta-analysis.

We excluded case reports, narrative reviews, systematic reviews, theoretical research, expert comment and economic analysis. Studies in which Dieulafoy's lesion was part of a bigger pool of patients and their data was analyzed concomitantly were also excluded.

Data extraction

Two reviewers independently assessed the studies for eligibility and data was extracted from the in-

cluded studies in two parts. The first part included basic information such as author name, publication year, journal, volume, issue, pages, study design, sample size, size of each management group (mechanical or injection) and types of bias suspected in each study. The second part of the data extraction process included clinical outcomes, namely, initial hemostasis, recurrent bleeding, death and operation. In case of any discrepancy between the investigators, it was resolved through discussion.

Risk of bias assessment

We assessed the risk of bias using the Cochrane risk-of-bias tool. After evaluating each study, several criteria, including random sequence generation, allocation concealment, blinding of participants and personnel to the study protocol, blinding of outcome assessment, incomplete outcome data and selective reporting, were assessed and classified as low risk, high risk or unclear (Figures 2 and 3). If a trial had a high risk of bias for more than one key area, it was classified as having a high risk of bias. Conversely, if a trial had a low risk of bias for all key areas, it was classified as having a low risk of bias. Trials that did not fall into either of these categories were considered to have an unclear risk of bias.

Since four of the seven studies were retrospective, the selection bias was considerable. However, the studies generally showed a low risk of attrition and reporting bias.

Statistical analysis

The statistical analysis was performed using Review Manager 5.4 (The Cochrane Collaboration, 2020). For dichotomous data, risk ratio (RR) with

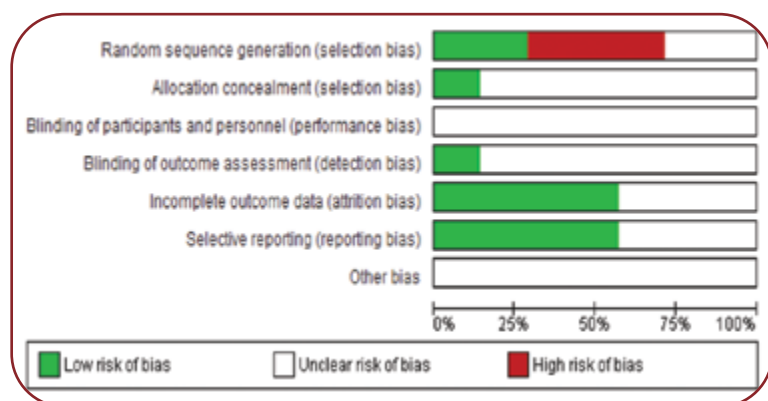


FIGURE 2. Risk of bias graph – reviewing authors' judgements about each risk of bias item presented as percentages across all included studies

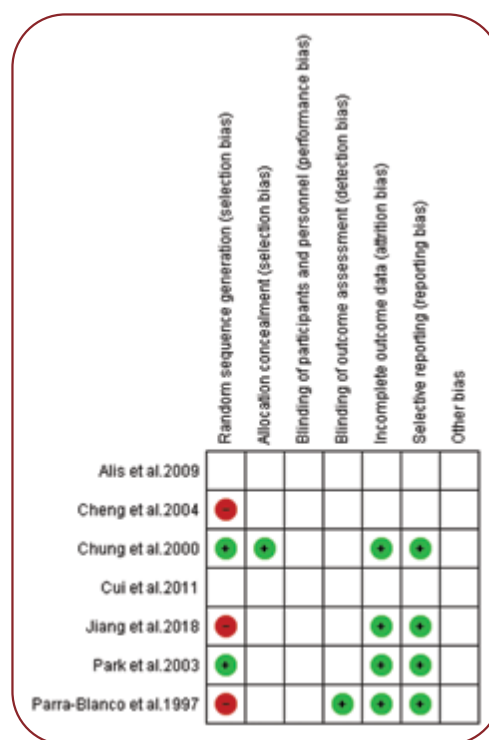


FIGURE 3. Risk of bias summary – reviewing authors' judgements about each risk of bias item for each included study

95% confidence interval (CI) was utilized, while for continuous data, standardized mean differences and 95% CI were used. For each outcome, two subgroups were created in a way that prospective studies were analyzed separately from retrospective studies. To assess heterogeneity, Q testing and I^2 statistics were used. If the P-value was less than or equal to 0.10 or I^2 was greater than 50%, indicating significant heterogeneity, the random-effects model was chosen. Conversely, if the P-value was greater than 0.10 or I^2 was less than 50%, the fixed-effect model was used. A P-value of 0.05 was considered statistically significant. □

RESULTS

Seven studies, comprising three randomized controlled trials and four retrospective comparative studies (8-14), met the inclusion criteria and were included in our research. The selected studies totalized 276 patients, of whom 147 in the mechanical group and 129 in the injection group. Table 1 summarizes the different characteristics of the selected studies.

A clinical trial compared endoscopic therapies for Dieulafoy's lesions in 24 patients, who were

Study	Methods	Participants	Measured outcomes
Chung <i>et al</i> , 2000 (8)	Clinical trial	12 mechanical vs 12 injection	Initial hemostasis, recurrent bleeding, operation, permanent hemostasis, death
Cui <i>et al</i> , 2011 (9)	Clinical trial	31 mechanical vs 46 injection	Successful endoscopic hemostasis: endoscopic demonstration, absence of clinical manifestations. Unsuccessful endoscopic hemostasis: hematemesis or dark stools, hemoglobin decrease >20 g/L, evidence of hypovolemic shock, manifestations of bleeding/necessity of transfusion, operation, rebleeding
Alis <i>et al</i> , 2009 (12)	Retrospective analysis	10 mechanical vs eight injection	Rebleeding, operation, initial hemostasis
Park <i>et al</i> , 2003 (13)	Clinical trial	16 injection vs 16 mechanical	Initial hemostatic failure, recurrent bleeding, surgery, permanent hemostasis
Jiang <i>et al</i> , 2018 (14)	Retrospective analysis	12 mechanical vs six injection	Hemostasis failure, persistent bleeding, surgery, death, blood transfusion
Cheng <i>et al</i> , 2004 (10)	Retrospective analysis	Two mechanical vs 15 injection	Rebleed, transfusion, initial hemostasis, death, surgery
Parra-Blanco <i>et al</i> , 2004 (11)	Retrospective analysis	18 mechanical vs two injection	Initial therapy, rebleeding, transfusion, discharge, death, surgery

TABLE 1.
Characteristics of
included studies

divided into mechanical (hemoclippping and band ligation) and injection groups. The mechanical group required fewer sessions to achieve permanent hemostasis (1.17 vs. 1.67) and had higher initial hemostasis rates (91.7% vs. 75%). No patients in the mechanical group needed surgery, compared to 17% in the injection group. Recurrent bleeding was significantly lower in the mechanical group (8.3% vs. 33.3%, $p < 0.05$). The study concluded that mechanical therapy was more effective for initial hemostasis and reducing recurrent bleeding in Dieulafoy's lesions. Measured outcomes included initial hemostasis, recurrent bleeding, operation, permanent hemostasis and death (8).

Similarly, another study investigated endoscopic hemostasis methods for GI bleeding due to Dieulafoy's lesion in 107 patients. They were treated with aethoxysklerol injection (46 cases), hemoclip hemostasis (31 cases), or a combination of both (30 cases). The success rates were 71.7%, 77.4%, and 96.7%, respectively, with significant differences between the methods ($P < 0.05$). Unsuccessful treatments often required alternative endoscopic methods or surgery. No serious complications or re-bleeding occurred during a one-year follow-up. The study concludes that combined therapy is the most effective method. Measured outcomes included successful and unsuccessful endoscopic hemostasis, hematemesis, dark stools, hemoglobin (Hb) decrease >20 g/L, hypovolemic shock, bleeding manifestations, necessity of transfusion, operation and rebleeding (9).

In addition, a study compared band ligation and injection therapy for treating Dieulafoy's lesions in 18 patients with upper GI bleeding. Par-

ticipants were randomized into two groups: band ligation (10 patients) and injection therapy (eight patients). The study found that rebleeding occurred in 75% of patients assigned to the injection therapy group but in none of those included in the band ligation group. The rebleeding rate and mean hospital stay were significantly higher for the injection therapy group. The study concludes that band ligation is superior to injection therapy for treating Dieulafoy's lesions. Measured outcomes included rebleeding, operation and initial hemostasis (12).

Furthermore, another study compared the hemostatic efficacy of endoscopic hemoclippping and epinephrine injection therapy for treating bleeding Dieulafoy's lesions in 32 patients. They were randomly assigned to either hemoclippping (16 patients) or epinephrine injection (16 patients). There was no significant difference in primary hemostasis rates between the two groups (93.8% vs. 87.5%). However, hemoclippping showed a trend towards requiring fewer endoscopic sessions for permanent hemostasis (6.3% vs. 31.3%) and was significantly more effective in preventing recurrent bleeding (0% vs. 35.7%). No bleeding-related deaths occurred. Measured outcomes included initial hemostatic failure, recurrent bleeding, surgery and permanent hemostasis. (13)

Additionally, a study retrospectively analyzed the effectiveness of cyanoacrylate injection versus hemoclip placement for treating bleeding Dieulafoy's lesions in the duodenum. Eighteen patients (six receiving cyanoacrylate injection and 12 receiving hemoclips) were included. All patients underwent endoscopic examination and/or

endotherapy within 12 hours of hospital admission. The study found no significant difference in primary hemostasis or recurrent hemorrhage rates between the two groups. One patient in the hemoclip group experienced melena three days after treatment and required cyanoacrylate injection. There were no significant side effects reported. Measured outcomes included hemostasis failure, persistent bleeding, surgery, death and blood transfusion, with no notable differences between the two groups (14).

Moreover, a study reviewed 29 patients with Dieulafoy's lesions among 1393 cases of acute nonvariceal upper GI bleeding. Patients were treated with different endoscopic methods comprising epinephrine injection, epinephrine plus heater probe coagulation, histoacryl injection and hemoclipping. Initial treatment failure occurred in three patients from the epinephrine group, who

then received surgery or other therapies. Recurrent bleeding was noted in two patients from the same group but was controlled with additional therapy. Epinephrine plus heater probe coagulation had a significantly higher success rate (100% vs. 54%) compared to epinephrine alone. No complications were reported and no further bleeding occurred during follow-up. Measured outcomes included rebleed, transfusion, initial hemostasis, death and surgery (10).

Finally, a study analyzed the clinical features and therapeutic outcomes in 26 patients with upper GI bleeding from Dieulafoy's lesions. Endoscopic therapy was used, with hemoclipping in 18 patients, heater probe in six subjects and ethanol injection in the two remaining patients. Initial therapy was successful in 22 cases (84.6%), with additional endoscopic therapy achieving hemostasis in three more cases (11.5%). Only one pa-

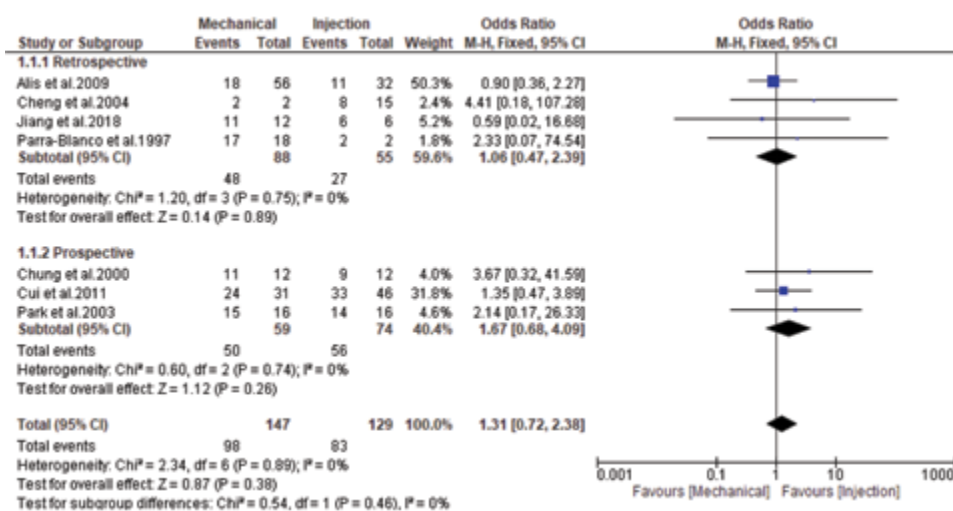


TABLE 2. Forest plot showing the odds of successful initial hemostasis between mechanical and injection endoscopic therapy in the management of Dieulafoy's lesion

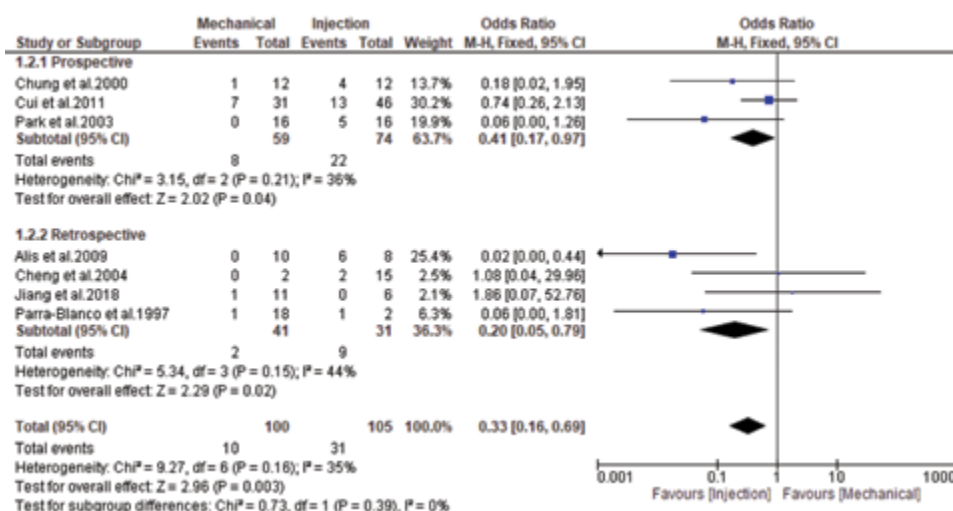


TABLE 3. Forest plot showing the odds of recurrent bleeding between mechanical and injection endoscopic therapy in the management of Dieulafoy's lesion

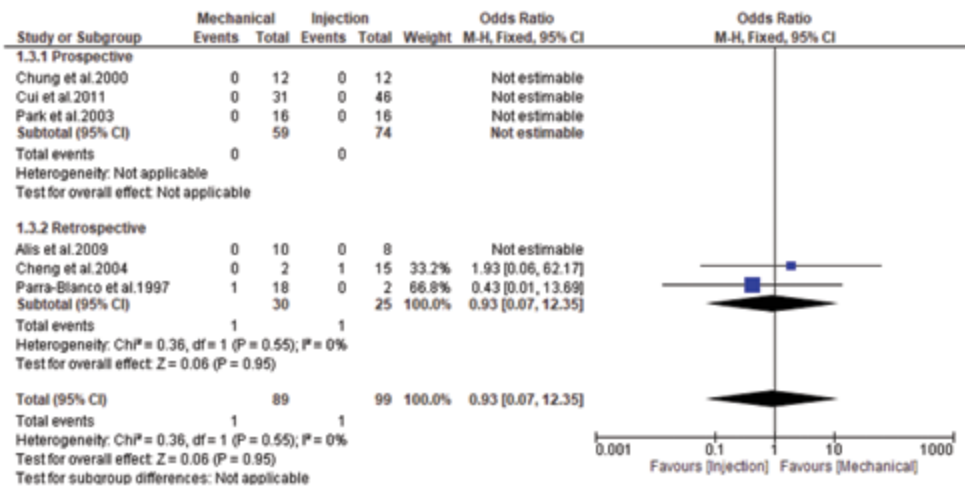


TABLE 4. Forest plot showing the odds of death as an outcome when comparing between mechanical and injection endoscopic therapy in the management of Dieulafoy's lesion

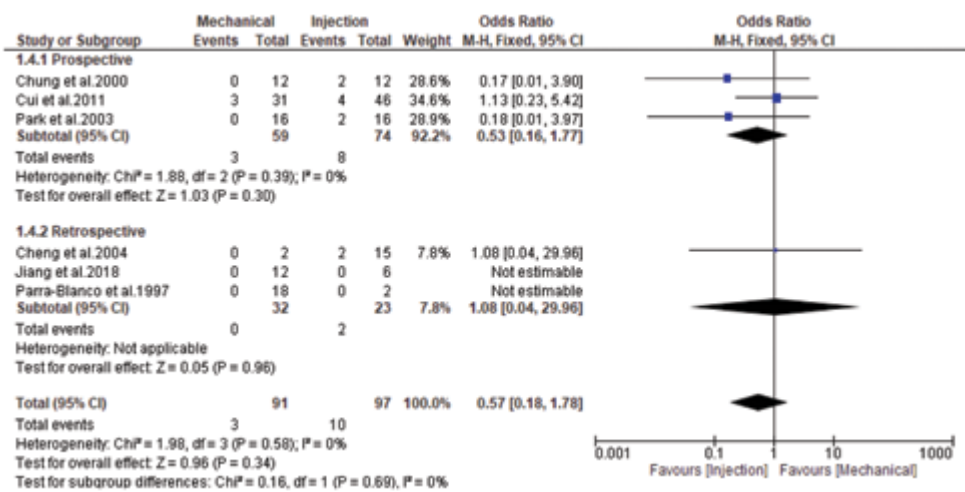


TABLE 5. Forest plot showing the odds of operation when comparing between mechanical and injection endoscopic therapy in the management of Dieulafoy's lesion

tient required surgical intervention due to uncontrolled bleeding. There were no side effects from the endoscopic treatments and no rebleeding was observed over a mean follow-up of 36 months. The measured outcomes included initial therapy success, rebleeding, transfusion needs, discharge, death and the necessity for surgery. The study concludes that endoscopic methods, particularly hemocclipping, are effective and should be the first choice for managing Dieulafoy's lesions (11).

These studies collectively highlight the effectiveness of various endoscopic therapies for managing Dieulafoy's lesions, with mechanical methods generally showing superior outcomes in terms of initial hemostasis and reducing recurrent bleeding. Tables 2-5 showcase these findings.

Initial hemostasis

All seven studies reported comparative results about initial hemostasis between the two methods. The results showed no significant differ-

ence between mechanical and injection methods (OR 1.31; 95% CI [0.72, 2.38], P=0.48).

Recurrent bleeding

All seven studies included results concerning recurrent bleeding outcome between mechanical and injection interventions. The results showed a significant advantage that favors injection methods compared to mechanical ones (OR 0.33; 95% CI [0.16, 0.69]; P=0.003).

Death

Six of the seven selected studies marked death as an outcome when comparing the two methods. However, due to the rarity of this event, only two of all patients died, which makes the statistical data not estimable.

Operation

Six out of the seven selected studies measured operation as an outcome in the comparison of the

two methods. The studies included 91 patients in the mechanical group and 97 in the injection group. However, the results were not statistically significant (OR 0.57; 95% CI [0.18, 1.78]; $P=0.34$). $\square$

DISCUSSION

Dieulafoy's Lesion was first described by Gallard T. in 1884 in the stomach and it was named after G. Dieulafoy who described it as "exulceratio simplex" (6). It was afterwards described in different parts of the GI tract, like the esophagus (15), duodenum (16), jejunum (17), ileum (18), cecum (19), colon (20), rectum (21) and the anal canal (22). It is a rare but potentially life-threatening condition characterized by a protruding artery in the GI tract wall that can cause severe gastrointestinal bleeding. The management of this condition has evolved over the years and endoscopic techniques emerged as a promising approach for its treatment (22). After the diagnosis is made, different therapeutical options are available, including either mechanical methods like endoscopic band ligation and hemoclip placement (23), argon plasma coagulation (24, 25), or injection (26-28). Combination of different means is also done (29) and showed to be the preferred means in Malik et al's systematic review about jejunal lesions (30). If bleeding reoccurs, repeating endoscopy, angiographic embolization or surgical wedge resection can be performed.

Given the lack of clear consensus regarding the best approach for the treatment of this condition, we conducted this meta-analysis to compare the outcomes of mechanical and injection endoscopic techniques for the treatment of Dieulafoy's lesion.

Our findings indicate that both techniques have similar efficacy and safety profiles in terms of death, operation and initial hemostasis. However, the main different outcome was the superiority of injection techniques in preventing recurrent bleeding. This finding was not confirmed in the study done by Lai et al (31), where treating

Dieulafoys's lesion by injection techniques was found to be a risk factor of rebleeding in comparison with all other techniques. Their study did not meet our inclusion criteria and therefore it was not included in our meta-analysis.

CONCLUSION

To sum up, although no increase in mortality or need for operation was proven in the study, recurrent bleeding would constantly pose a major concern when it comes to the medical team and the patient, as it requires additional treatment and an increase in the overall cost of management. The lower incidence of recurrent bleeding with injection techniques suggests that this approach may be preferred over mechanical techniques since it is an easy technique with proven efficiency and a low cost at the same time. Currently, most physicians, who are globally based on their expertise, continue to choose the endoscopic method for treating Dieulafoy's lesion. However, our meta-analysis provides strong evidence supporting the use of injection techniques for the treatment of this lesion. Further research is definitely needed to confirm the findings and to determine the optimal treatment approach for this rare yet challenging potentially life-threatening condition. $\square$

Data availability: All data analyzed in this study are included in this published article. Further inquiries can be directed to the corresponding author.

Ethics statement: This meta-analysis is based on previously published studies. No new data involving human participants were collected or analyzed by the authors and therefore, ethical approval and informed consent were not required.

Conflicts of interest: none declared.

Financial support: none declared.

Acknowledgments: The authors would like to acknowledge the support and contributions of all individuals and institutions who assisted in the completion of this work.

REFERENCES

1. Wang Y, Bansal P, Li S, et al. Dieulafoy's lesion of the upper GI tract: a comprehensive nationwide database analysis. *Gastrointest Endosc* [Internet]. 2021 Jul [cited 2023 Mar 2];94(1). Available from: <https://pubmed.ncbi.nlm.nih.gov/33359438/>.
2. Schmulewitz N, Baillie J. Dieulafoy

- lesions: a review of 6 years of experience at a tertiary referral center.
Am J Gastroenterol 2001;96:1688-1694.
3. **Levy AR, Broad S, Loomis III JR, Thomas JA.** Diagnosis and Treatment of a Recurrent Bleeding Dieulafoy's Lesion: A Case Report.
Cureus 2022;14:e32051.
4. **Malik TF, Anjum F.** Dieulafoys Lesion Causing Gastrointestinal Bleeding. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2022 [cited 2023 Mar 3]. Available from: <http://www.ncbi.nlm.nih.gov/books/NBK562267/>.
5. **Gallard T.** Aneurysmes milliaires de l'estomac, donnant lieu a des hematemeses mortelles.
Bull Mem Soc Med Hop Paris 1884;1:84-91.
6. **Dieulafoy: Exulceratio simplex: L'intervention chirurgica...** - Google Scholar [Internet]. [cited 2023 Mar 2]. Available from: https://scholar.google.com/scholar_lookup?journal=Bull+Acad+Natl+Med&title=Exulceratio+simplex.+L%E2%80%99interventio+n+chirurgicale+dans+les+hematemeses+fo+udroyantes+consecutives+a+l%E2%80%99exulceration+simple+de+l%E2%80%99estomac&author=G+Dieulafoy&volume=39&publication_year=1898&pages=49-84&
7. **Lara LF, Sreenarasimhaiah J, Tang S Jiang, et al.** Dieulafoy lesions of the GI tract: localization and therapeutic outcomes.
Dig Dis Sci 2010;55:3436-3441.
8. **Chung IK, Kim EJ, Lee MS, et al.** Bleeding Dieulafoy's lesions and the choice of endoscopic method: comparing the hemostatic efficacy of mechanical and injection methods.
Gastrointest Endosc 2000;52:721-724.
9. **Cui J, Huang LY, Liu YX, et al.** Efficacy of endoscopic therapy for gastrointestinal bleeding from Dieulafoy's lesion.
World J Gastroenterol 2011;17:1368-1372.
10. **Cheng CL, Liu NJ, Lee CS, et al.** Endoscopic management of Dieulafoy lesions in acute nonvariceal upper gastrointestinal bleeding.
Dig Dis Sci 2004;49:1139-1144.
11. **Parra-Blanco A, Takahashi H, Méndez Jerez PV, et al.** Endoscopic management of Dieulafoy lesions of the stomach: a case study of 26 patients.
Endoscopy 1997;29:834-839.
12. **Alis H, Oner OZ, Kalayci MU, et al.** Is endoscopic band ligation superior to injection therapy for Dieulafoy lesion?
Surg Endosc 2009;23:1465-1469.
13. **Park CH, Sohn YH, Lee WS, et al.** The usefulness of endoscopic hemoclippping for bleeding Dieulafoy lesions.
Endoscopy 2003;35:388-392.
14. **Jiang Y, Hu J, Li P, et al.** A Retrospective Analysis of Cyanoacrylate Injection versus Hemoclip Placement for Bleeding Dieulafoy's Lesion in Duodenum.
Gastroenterol Res Pract 2018;2018:3208690.
15. **Burke EP.** Esophageal Dieulafoy Lesion: A Rare and Potentially Fatal Entity.
Case Rep Gastrointest Med [Internet]. 2021 Mar 4 [cited 2023 Mar 29];2021. Available from: <https://pubmed.ncbi.nlm.nih.gov/33747575/>.
16. **He Z-W, Zhong L, Xu H, et al.** Massive gastrointestinal bleeding caused by a Dieulafoy's lesion in a duodenal diverticulum: A case report.
World J Clin Cases [Internet]. 2020 Oct 26 [cited 2023 Mar 29];8(20). Available from: <https://pubmed.ncbi.nlm.nih.gov/33195675/>.
17. **Kalantari ME, Sardarzadeh N, Mirsadeghi A, et al.** Jejunal Dieulafoy's Lesion as a Rare Cause of Massive Gastrointestinal Bleeding; a Case Report and Literature Review.
Arch Acad Emerg Med [Internet]. 2022 Jul 27 [cited 2023 Mar 29];10(1). Available from: <https://pubmed.ncbi.nlm.nih.gov/36033991/>.
18. **Garcia-Sanchez C, Pintor-Tortolero J, De la Portilla F.** Ileal Dieulafoy's lesion as a rare cause of lower gastrointestinal bleeding associated with inflammatory bowel disease.
ANZ J Surg [Internet]. 2021 May [cited 2023 Mar 29];91(5). Available from: <https://pubmed.ncbi.nlm.nih.gov/33999525/>.
19. **Dokmak A, Muso E.** Gastrointestinal Bleeding from Dieulafoy's Lesion in the Cecum.
Case Rep Gastroenterol 2022;16:601-606.
20. **Khan S, Niaz S, Singh R, et al.** Dieulafoy Lesion of the Colon: A Rare Finding During Colonoscopy.
Cureus [Internet]. 2022 May 21 [cited 2023 Mar 29];14(5). Available from: <https://pubmed.ncbi.nlm.nih.gov/35746982/>.
21. **Han P, Hou W, Chen N, et al.** Severe lower gastrointestinal bleeding caused by rectal Dieulafoy's lesion: Case reports and literature review.
Medicine (Baltimore) [Internet]. 2022 Dec 2 [cited 2023 Mar 29];101(48). Available from: <https://pubmed.ncbi.nlm.nih.gov/36482623/>.
22. **Gurala D, Philipose J, Haddad FG, Deeb L.** A Bleeding Dieulafoy's Lesion in the Anal Canal.
Cureus [Internet]. 2019 Jan 8 [cited 2023 Mar 29];11(1). Available from: <https://pubmed.ncbi.nlm.nih.gov/30891393/>.
23. **Dulic-Lakovic E, Dulic M, Hubner D, et al.** Bleeding Dieulafoy lesions of the small bowel: a systematic study on the epidemiology and efficacy of enteroscopic treatment - PubMed [Internet]. [cited 2023 Mar 29]. Available from: <https://ezproxy.usj.edu.lb/2061/21802676/>.
24. **Iacopini F, Petruzzello L, Marchese M, et al.** Hemostasis of Dieulafoy's lesions by argon plasma coagulation (with video).
Gastrointest Endosc [Internet]. 2007 Jul [cited 2023 Mar 29];66(1). Available from: <https://pubmed.ncbi.nlm.nih.gov/17591469/>.
25. **Matsui S, Kamisako T, Kudo M, Inoue R.** Endoscopic band ligation for control of nonvariceal upper GI hemorrhage: comparison with bipolar electrocoagulation.
Gastrointest Endosc [Internet]. 2002 Feb [cited 2023 Mar 29];55(2). Available from: <https://pubmed.ncbi.nlm.nih.gov/11818925/>.
26. **Mumtaz R, Shaukat M, Ramirez FC.** Outcomes of endoscopic treatment of gastroduodenal Dieulafoy's lesion with rubber band ligation and thermal/injection therapy.
J Clin Gastroenterol [Internet]. 2003 Apr [cited 2023 Mar 29];36(4). Available from: <https://pubmed.ncbi.nlm.nih.gov/12642736/>.
27. **Nadal E, Burra P, Senzolo M.** Cyanoacrylate injection to treat recurrent bleeding from Dieulafoy's lesion.
Gastrointest Endosc [Internet]. 2013 Dec [cited 2023 Mar 29];78(6). Available from: <https://pubmed.ncbi.nlm.nih.gov/24237954/>.
28. **D'Imperio N, Papadia C, Baroncini D, et al.** N-butyl-2-cyanoacrylate in the endoscopic treatment of Dieulafoy ulcer.
Endoscopy [Internet]. 1995 Feb [cited 2023 Mar 29];27(2). Available from: <https://pubmed.ncbi.nlm.nih.gov/7601062/>.
29. **Pérez Fernández A, Mateos JMR, Sánchez Fernández MJ, et al.** Recurrent small-bowel bleeding from a Dieulafoy's lesion after combined endoscopic treatment.
Rev Esp Enferm Dig [Internet]. 2020 Apr [cited 2023 Apr 2];112(4). Available from: <https://pubmed.ncbi.nlm.nih.gov/32193938/>.
30. **Malik A, Inayat F, Goraya MHN, et al.** Jejunal Dieulafoy's Lesion: A Systematic Review of Evaluation, Diagnosis, and Management.
J Investig Med High Impact Case Rep [Internet]. 2021 Dec [cited 2023 Apr 2];9. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7829607/>.
31. **Lai Y, Rong J, Zhu Z, et al.** Risk Factors for Rebleeding after Emergency Endoscopic Treatment of Dieulafoy Lesion.
Can J Gastroenterol Hepatol 2020;2020:2385214.