



COMPARISON OF STAPLED HAEMORRHOIDECTOMY VERSUS OPEN HAEMORRHOIDECTOMY - META-ANALYSIS

General Surgery

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ABSTRACT

Aim: To compare the stapled haemorrhoidectomy with open haemorrhoidectomy – Meta-analysis

Objectives: To retrieve articles relevant to our study from literature data base. To assess the quality of collected articles bases on Newcastle–Ottawa scale (NOS) criteria and Cochrane Risk of Bias criteria (CRBC). To perform meta-analysis for the outcome of post-operative bleeding and urinary retention. To evaluate publication bias by using funnel plot.

KEYWORDS

INTRODUCTION

Haemorrhoids which is also known as piles, affects nearly 8% to 35 % of general population. Haemorrhoids are blood vessels located in the walls of smooth muscles in the rectum and anus. Rectum and anus are the lower part of the digestive system. In large intestine rectum is the lower part. Haemorrhoids are located at the junction where the small arteries and veins merge. They help the body to control the stool. The vessels which support the tissues in the large intestine stretch. So the vessels expand which causes thinning of wall and bleeding of vessels. Haemorrhoid is a swelling in the outer and inner lining of the anus. The protrusion of vessel occurs when the vessel stretches continuously. In some people veins in the anus gets inflamed and bulge which causes pain during defecation. It is most commonly seen in people above the age of 40. But nowadays even teenage people are suffering from haemorrhoidal disease.

RESULTS

Out of 890 studies, 17 studies were selected for the further evaluation. The PRISMA flow chart (figure 1) shows the selection process of articles for this meta-analysis. All the studies included in this meta-analysis compared the Stapled Haemorrhoidectomy and Open Haemorrhoidectomy that has patients baseline characteristics. Both RCT and non RCT studies are selected. The first author and the year of publication of selected RCT articles are Brian J Mehigan 2000, R.Shalaby 2001, Domenico Palimento 2003, A. Racalbutto 2004, Jai Bikhchandani 2005, C.Ammaturo 2012 and A. Cariati 2015. The first author and the year of publication of the selected articles which re non RCTs are Jean Francois Gravie 2005, Claudio Mattana 2007, Ramesh Singh Bhandari 2014, Srikanth Kulkarni 2016, Kapil Baliga 2016, Vivek Maurya 2017, Idoor D. Sachin 2017, S.Naresh kumar 2017, Yerrolla Bhaskar Reddy 2020 and Shalabh Gupta 2019. The RCT studies which are selected were evaluated by Cochrane Risk of Bias (Table 2) and the non RCT articles were evaluated under the Newcastle–Ottawa scale (NOS) criteria (Table 3). All the articles fulfilled the inclusion and exclusion criteria.

Characteristics Of Selected Studies

The selected studies for this meta-analysis were assessed for the outcome of post-operative bleeding and urinary retention in the stapled haemorrhoidectomy and open haemorrhoidectomy. These are assessed for at least one or both the outcomes. All the seventeen studies had the outcome of post-operative bleeding. In this 1967 patients were involved in this meta-analysis to get the outcome of post-operative bleeding in both stapled haemorrhoidectomy and open haemorrhoidectomy. Out of 1967 patients, 903 patients undergone stapled haemorrhoidectomy and the rest 1064 patients undergone open haemorrhoidectomy. In this meta-analysis thirteen studies had the outcome of urinary retention. Total of 1107 patients were involved in this meta-analysis to get the outcome of urinary retention. 553 patients undergone stapled haemorrhoidectomy and 554 patients undergone open haemorrhoidectomy.

Post-operative Bleeding

The outcome of post-operative bleeding was mentioned in all the seventeen studies that involved patients undergoing stapled haemorrhoidectomy and open haemorrhoidectomy. Total numbers of 1967 patients were involved in which 903 patients undergone stapled haemorrhoidectomy and 1064 patients' undergone open haemorrhoidectomy. In 903 patients who had stapled haemorrhoidectomy 62 patients had post-operative bleeding. In 1064 patients who had open haemorrhoidectomy 60 patients had post-operative bleeding. Based on the calculation of heterogeneity between the studies with $RR = 1.08$, 95% CI, $Chi^2 = 23.13$, $df = 16$ ($P = 0.11$); $I^2 = 31\%$. The I^2 value is less than 50% so the fixed effect is implemented. In this meta-analysis there is difference in the occurrence of the event but there is no significant difference between stapled haemorrhoidectomy compared to the open haemorrhoidectomy based on the outcome of post-operative bleeding as shown in figure 1.

Then the funnel plot is done which showed no publication bias for the studies included in the outcome of post-operative bleeding (figure 2).

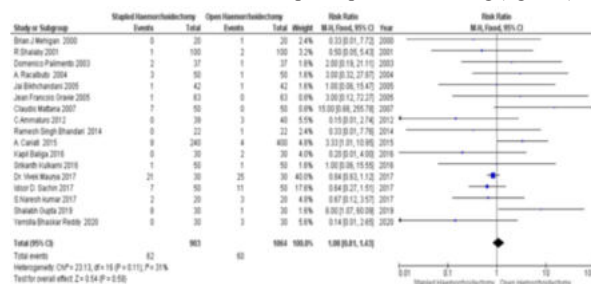


FIGURE 1

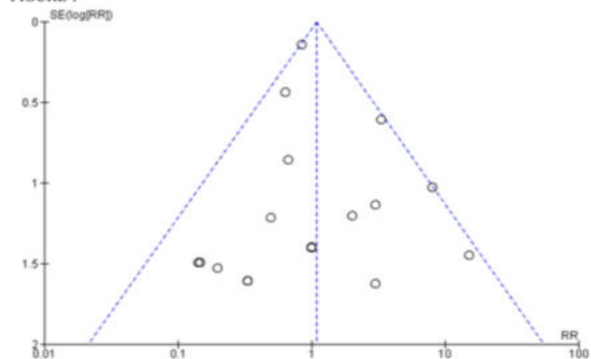


FIGURE 2

Urinary Retention

Based on the outcome of urinary retention, thirteen studies reported the patients who underwent the procedures of stapled haemorrhoidectomy and open haemorrhoidectomy. Total number of patients participated in this study were 1107. Out of 1107 patients, 553 patients underwent stapled haemorrhoidectomy. The number of patients who showed urinary retention in stapled haemorrhoidectomy is 52 patients. In 554 patients who had undergone open haemorrhoidectomy 89 patients had urinary retention. Based on the calculation of heterogeneity between the studies $I^2 = 0\%$. Since I^2 value is less than 50% the fixed was implemented in this meta-analysis. The forest plot shows significant difference between the stapled haemorrhoidectomy and open haemorrhoidectomy based on the outcome of urinary retention with $RR = 0.59$, 95% CI, $Chi^2 = 4.54$, $df = 12$ ($P = 0.97$); as shown in figure 3. There is non publication bias for the studies

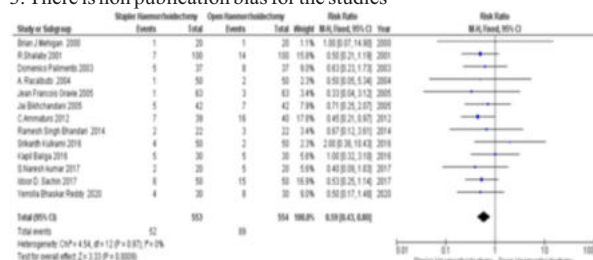


FIGURE 3

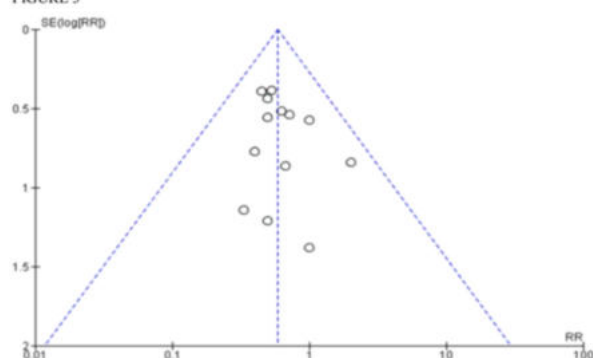


FIGURE 4
included in the outcome of urinary retention in this meta-analysis which is showed by funnel plot in figure 4.

DISCUSSION

Haemorrhoidal disease is one of the most common anorectal diseases. Haemorrhoids are a prolapse of the anal cushion. This meta-analysis includes $n=17$ studies which has total of 1967 participants to compare the stapled haemorrhoidectomy versus open haemorrhoidectomy with the outcome of post-operative bleeding and urinary retention. A significant analysis is showed between the stapled haemorrhoidectomy and open haemorrhoidectomy. Longo's procedure had a positive effect on the patients with haemorrhoidal disease.

Haemorrhoidectomy is the procedure which is done to the patients with haemorrhoidal disease. The most commonly used procedure for haemorrhoidectomy is open haemorrhoidectomy which is introduced by Milligan and Morgan because of its efficacy, side effects and the cost of the procedure.

The Stapled haemorrhoidectomy (Longo's procedure) is the modern technique which is used in the treatment of haemorrhoidal disease. The abnormal anal cushions are the mass of thick submucosa. It has high vasculature within the anal canal. It also has blood vessels, smooth muscle elastic tissue and connective tissue. In this procedure the circumferential part of the submucosa and the rectal mucosa are resected. This leads to the restoration of haemorrhoid which will have better venous supply in that region. Above the pectinate line, an interrupted purse-string suture was set with the help of a special anal dilator. The suture was tightened around the circular stapler. Then the stapler is removed. The interrupted sutures are done to control the bleeding from the operated site.

In this meta-analysis totally seventeen studies are selected. Out of

seventeen studies fifteen studies has the outcome of post-operative bleeding. Out of seventeen studies thirteen studies has the outcome of urinary retention. Totally 903 patients participated in the stapled haemorrhoidectomy and 1064 patients participated in the open haemorrhoidectomy. In 903 patients 62 patients had post-operative bleeding who undergone stapled haemorrhoidectomy. Out of 1064 patients, 60 patients who had undergone open haemorrhoidectomy had post-operative bleeding.

Looking at it individually for the outcome of post-operative bleeding, some studies have vast difference in the comparative group. In Brian J Mehigan's article the total numbers of participants in the study are 40 which they were split randomly for both the comparative groups. The outcome post-operative bleeding was seen only in one patient in the open haemorrhoidectomy group. In R Shalaby's article published in the year 2001, the total number of participants in the whole study is 200 who were divided randomly to the both comparative groups. The outcome of postoperative is 2 in open haemorrhoidectomy than in stapled haemorrhoidectomy which has only one outcome. In the study done by Domenico Palimento which is published in the year 2003, the total participants in the study were 74 divided randomly into 37 for each group. The stapled haemorrhoidectomy had the higher number of outcome which is of 2 and open haemorrhoidectomy had the outcome in 1 patient. In A. Racoluto's study which is done in the year 2004 have 50 patients in each group in which 3 patients had the outcome of post-operative bleeding in stapled haemorrhoidectomy and 1 patient in the other comparative group. In the study done by Jai Bikhchandani both the comparative groups had the same the outcome of post-operative bleeding in 1 patient. Only 1 patient had post-operative bleeding in the stapler haemorrhoidectomy group out of 63 and in open haemorrhoidectomy group no patient had the post-operative bleeding in the study done by Jean Francois Gravie, published in the year 2005. In Claudia Mattana's study totally 100 patients were involved who were divide equally to the comparative groups. Only 7 patients who had undergone stapled haemorrhoidectomy had the post-operative bleeding. In C. Ammaturo's study published in the year 2012 totally 80 patients were involved in the study that was divided equally to the comparative groups. But due to some reasons which were not mentioned in the study one patient in the stapled group was not involved in the study. Thus 39 patients undergone stapled haemorrhoidectomy and 40 patients undergone open haemorrhoidectomy. Only 3 patients in the open haemorrhoidectomy had the post-operative bleeding. In 2014 Ramesh Singh Bhandari published his paper in which he had studied the comparison of open haemorrhoidectomy with stapled haemorrhoidectomy. In his study 44 patients were included who were distributed equally to the comparative groups. Out of which only 1 patient in the open haemorrhoidectomy had post-operative bleeding. In A Carita's paper published in the year 2015, 640 patients were involved in their study. Out of which 240 patients had undergone stapled haemorrhoidectomy and the rest of the 400 patient's undergone open haemorrhoidectomy. In Kapila Baliga's study the total numbers of patients involved were 60 which are divided into the comparative group. Out of 30 patients in the open haemorrhoidectomy 2 patients had post-operative bleeding. None had post-operative bleeding in the stapled haemorrhoidectomy. 100 patients were involved in the Srikanth Kulkarni study. Out 50 patients in each group 1 patient had post-operative bleeding in both the groups. In the study done by Dr. Vivek Maurya which is published in the year 2017 has totally 60 participants. Out of 30 patients involved in stapled haemorrhoidectomy 21 patients had post-operative bleeding. In open haemorrhoidectomy, out of 30 patients 25 patients had post-operative bleeding. In Idoor D. Sachin's study 100 patients were involved in their study which they are separated equally for both the comparative group. 7 patients in the stapled haemorrhoidectomy and 11 patients in open haemorrhoidectomy had post-operative bleeding. 40 patients were involved in the study done by S Nareesh Kumar which is published in the year 2017. Patients were divided for both the groups. 2 patients in stapled haemorrhoidectomy and 3 patients in the open haemorrhoidectomy had post-operative bleeding. Both Shalabh Gupta whose article published in the year 2019 and Yerrola Bhaskar Reddy's article published in the year 2020 had total patients of 60 patients in their each study. In stapled haemorrhoidectomy 8 and 0 patients and in open haemorrhoidectomy 1 and 3 patients had post-operative bleeding respectively.

In these studies nearly all the results are more or less same in both the comparative groups. Totally 62 patients in stapled haemorrhoidectomy had post-operative bleeding which is slightly higher than open

haemorrhoidectomy which has total of 60 patients. The study which has highest number of patients who had post-operative bleeding in both the comparative group was Dr. Vivek Maurya's study. Out of seventeen, five studies which are included in this meta-analysis had nil number of patients in stapled haemorrhoidectomy. But the other remaining studied gives higher number of outcome results which caused the increase in output. Overall post-operative bleeding is insignificant in the comparative study between stapled haemorrhoidectomy and open haemorrhoidectomy.

In this study total thirteen studies had the outcome of urinary retention. The comparative group in all studies had the outcome of urinary retention. But only in Brian J Mehigan study had the same outcome in their study. In all the other studies, such as R. Shalaby 2001, Domenico Palimento 2003, A. Racalbuto 2004, Jai Bikhchandani 2005, C. Ammaturo 2012 and A. Cariati 2015. Jean Francois Gravie 2005, Ramesh Singh Bhandari 2014, Srikanth Kulkarni 2016, Kapil Baliga 2016, Idoor D. Sachin 2017, S. Naresh kumar 2017 and Yerrolla Bhaskar Reddy 2020 reports that the complication urinary retention is higher in open haemorrhoidectomy than in the stapled haemorrhoidectomy. Thus the stapled haemorrhoidectomy is significantly better than the open haemorrhoidectomy. In this meta-analysis the patient's information's are collected from seventeen studies to increase the reliability of findings with added measure of selecting quality articles based on risk bias tool and Newcastle-Ottawa scale (NOS) criteria. In these seventeen studies, the seven randomised control trials were evaluated based on Cochrane Risk of Bias criteria. The remaining ten studies which are not RCT were assessed with Newcastle-Ottawa scale (NOS) criteria. All the selected non RCT s was scored more than seven. Thus it confirms that the quality of the included studies reflects the reliability of this meta-analysis. In addition to it more focused objective were provided as the evidence on haemorrhoidectomy and its procedures. In this meta-analysis the comparison of stapled haemorrhoidectomy with open haemorrhoidectomy showed significant difference in preventing urinary retention. There is no significant difference in the outcome of post-operative bleeding between stapled haemorrhoidectomy and open haemorrhoidectomy. Thus our meta-analysis suggests that stapled haemorrhoidectomy is the best option in comparison to open haemorrhoidectomy in the outcome of urinary retention. Our extensive literature search shows allow us to include several studies in both stapled haemorrhoidectomy and open haemorrhoidectomy side, which improves the reliability of meta-analysis by having larger sample size in each group. In this meta-analysis, seven randomised control studies were included which benefits the reliability of the result outcome. Recent RCTs that are qualified were included in this meta-analysis based on the Cochrane Risk of Bias criteria. Based on the Newcastle-Ottawa scale (NOS) criteria, the eligibility of non RCTs studies are tested.

CONCLUSION

The outcomes of studies which are included were limited by the heterogeneity. In this meta- analysis totally 17 studies were included. Statistically the stapled haemorrhoidectomy is significantly superior to the open haemorrhoidectomy was confirmed for urinary retention with numerical. But the post-operative bleeding shows no statistical significant difference between the stapled haemorrhoidectomy and open haemorrhoidectomy. The procedure stapled haemorrhoidectomy for haemorrhoidal disease results in increased in advantage than open haemorrhoidectomy. Further additional researches are required to confirm our findings.

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