Comparative Study between Conventional and Ligasure Hemorrhoidectomy

Thesis

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List of Abbreviations

Abb.	Full term
AC	Anal canal
HD	Hemorrhoidal disease
HDSS	Hemorrhoidal Disease Symptom Score
MMP-9	Matrix metalloproteinase-9
RBL	Rubber Band Ligation
SHS	Short Health Scale
SPSS	Statistical Package for Social Science
TGF-β	Transforming growth factor-β
VEGF	Vascular endothelial growth factor
VS	Vessel sealing

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Introduction

Hemorrhoids are common anorectal disorders. HEMORRHOIDS term is derived from the Greek adjective meaning bleeding (haema=bleed, rhoos=flowing) and emphasises the most important symptom of this disease. The word PILE derived from Latin word "pila" meaning a ball can be applied to all patients presenting with this disease as every patient with this disease present with some sort of swelling. At least 50% of the people over the age of fifty have some degree of haemorrhoid formation **(Vinayaka et al., 2018).**

All symptomatic piles definitely need surgical excision, especially when conservative measures or nonsurgical interventions failed to resolve the symptoms. Excision of piles whether surgically or by diathermy or even by stapler hemorrhoidopexy is usually indicated for symptomatic Grade 3 and 4 piles or when conservative measures failed for earlier grades of hemorrhoids or presence of concomitant chronic anal fissure or fistula **(Bulus et al., 2014).**

Excision of hemorrhoids is usually associated or results in severe and sometimes intolerable postoperative pain. Such pain remains the main concern which make

some patients reluctant to perform hemorrhoidectomy. Therefore, the search for less painful feasible, and effective alternative is still going on and still the main concern of many surgeons. Even when hemorrhoidectomy performed by diathermy using a monopolar cautery, still the pain is a well-known postoperative complication due to thermal spread and damage to nearby richly innervated tissue. Thus, limitation and minimizing the extent of thermal injury is expected to result in significant reduction of postoperative pain **(Noori, 2018).**

The availability of new techniques and devices has stimulated researchers to look for the best treatment for curing hemorrhoids. The ideal technique should combine high safety and efficacy of the treatment with low postoperative pain and discomfort along with an effective cost for the same **(Xu et al., 2015).** The Ligasure system (High frequency electro-thermal vessel sealing system) is a recently introduced device. It applies a precise amount of energy to vessel walls while they are being held in tight apposition under pressure. Thermal changes are essentially confined to within-the-jaw tissue. The entire process takes 2 to 5 sec, depending on vessel size and included tissue **(Kaushik et al., 2019).**

Aim of the Work

This prospective study was designed to compare between the two approaches for hemorrhoid surgery- conventional hemorrhoidectomy and Ligasure hemorrhoidectomy- in terms of operative time and intraoperative blood loss, as well as postoperative pain, hospital stay, healing process, bleeding, recurrence and anal stenosis.

Chapter (1):

Anatomy

Hemorrhoids are specialized, vascular cushions located in the anal canal. The hemorrhoidal cushions appear predictably in the right anterior, right posterior, and left lateral positions, although there may be intervening secondary hemorrhoidal complexes that blur this classic anatomy **(Sunil & Saumya, 2016).**

They are found in the submucosal layer and are considered sinusoids because they do not typically have a muscular wall. Hemorrhoids are held in the anal canal by Treitz muscle, a submucosal extension of the conjoined longitudinal ligament. The fibers seem to act as a support lattice not only for hemorrhoids but for other important structures in the anal canal. Some authors have reported a loss of these support structures with aging, perhaps explaining the increased incidence of hemorrhoidal complaints with age **(Hall, 2013).**

Classification of a hemorrhoid corresponds to its position relative to the dentate line. External hemorrhoids are located below the dentate line and develop from ectoderm embryonically. They are covered with anoderm, composed of squamous epithelium, and are innervated by

somatic nerves supplying the perianal skin and thus producing pain. In contrast, internal hemorrhoids lie above the dentate line and are derived from endoderm. They are covered by columnar epithelium, innervated by visceral nerve fibers and thus cannot cause pain **(Migaly & Sun, 2016).**

Arterial blood supply of the anal canal:

1. Superior hemorrhoidal artery (continuation of the Inferior Mesenteric Artery) supplies the mucous membrane of the anal canal up to the anal valves.
2. Inferior hemorrhoidal artery (branch of Pudendal Artery) supplies anal sphincters and entire thickness of the anal canal below the anal valves.
3. Branches of Median Sacral Artery supplies posterior part of the anorectal junction and the anal canal.

(Sunil & Saumya, 2016)

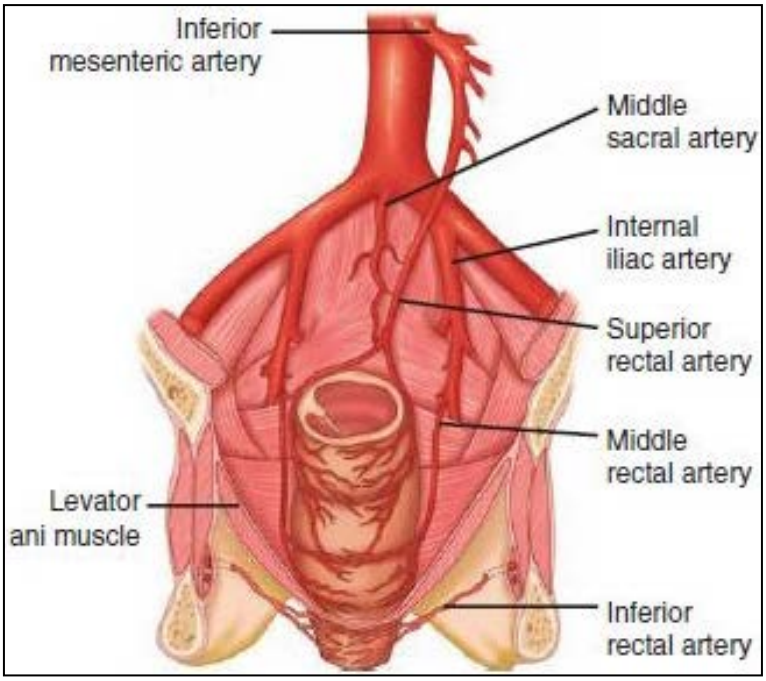

Figure (1): Arterial supply of the rectum and anal canal **(Bullard et al., 2010)**.

Venous drainage of anal canal begins in two plexuses:

1. The internal rectal plexus lies in the submucosa is drained mainly by the superior rectal vein, which is continued into the inferior mesenteric vein, a tributary to the portal vein .
2. The external rectal plexus lies lateral to the muscle coat drained mainly into the middle and inferior rectal veins .

(Sunil & Saumya, 2016)

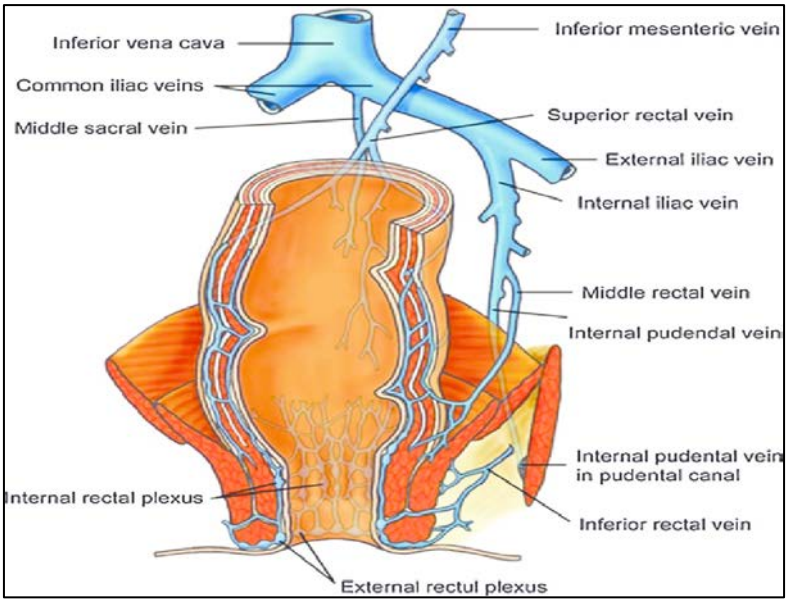

Figure (2): Venous drainage of rectum and anal canal **(Brown & Shorthouse, 2009).**

Innervation of the anal canal:

Superior to the pectinate line – visceral innervation is from the inferior hypogastric plexus. Sympathetic fibers maintain the tone of the internal anal sphincter. Parasympathetic fibers inhibit the tone of the internal sphincter and evoke peristaltic contraction for defaecation.

Superior to the pectinate line, the anal canal is sensitive only to stretching **(Lacobuzio-Donahue, 2009).**

Inferior to the pectinate line – somatic innervation derived from the inferior anal (rectal) nerves, branches of