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Efficacy of harmonic scalpel versus bipolar diathermy in hemorrhoidectomy: A systematic review and meta-analysis of nine randomized controlled trials**Fatma AlDabbous***Institute for Medical Specializations, Kuwait*

Statement of the problem: Hemorrhoidectomy is a common surgical procedure for treating third and fourth-degree prolapsed hemorrhoids. Despite being a minor surgery, it carries intraoperative and postoperative risks, including blood loss, pain, anal stenosis, urinary retention, hemorrhage, and incontinence. To reduce these morbidities, advanced tools like harmonic scalpel (HS), bipolar diathermy (BD), laser, and LigaSure have been developed.

Traditional hemorrhoidectomy, encompassing closed and open techniques, remains the gold standard. However, recent studies suggest that HS and BD may offer advantages over traditional methods. BD functions as an anti-hemorrhagic tool, delivering precise electrocautery energy with minimal thermal spread, while HS uses an ultrasonic blade vibrating at 55 kHz to simultaneously dissect and coagulate tissues, aiming to reduce thermal damage and improve cutting precision. Despite several randomized controlled trials (RCTs) comparing HS and BD, results have been inconclusive due to small sample sizes and variability. Therefore, we conducted a systematic review and meta-analysis of RCTs to evaluate the efficacy and safety of HS versus BD in reducing intraoperative and postoperative complications in hemorrhoidectomy patients.

Methodology & theoretical orientation: Research increasingly focuses on optimizing surgical methods for hemorrhoidectomy to minimize complications such as postoperative pain, urinary retention, anal stenosis, hemorrhage, operative time, and intraoperative blood loss. Our meta-analysis highlighted inconsistencies in randomized controlled trials (RCTs) regarding intraoperative endpoints like blood loss and operative time. While some studies favored bipolar diathermy (BD) over harmonic scalpel (HS), others found the opposite, and our pooled analysis showed no significant differences.

Postoperative pain, the most commonly reported complication, was influenced by various factors, with no technique demonstrating superiority in our analysis. A network meta-analysis by Balciscueta et al. indicated that conventional open hemorrhoidectomy resulted in more pain than closed techniques with BD or HS. Additionally, our analysis revealed no significant differences in postoperative outcomes like bleeding or urinary retention between HS and BD groups. LigaSure hemorrhoidectomy has been linked to fewer complications compared to conventional methods. Financially, BD offers substantial savings, averaging \$790 per procedure, emphasizing the importance of surgical method choice.

Findings / Results: Our search identified 601 articles after removing 963 duplicates. This systematic review and meta-analysis assessed the efficacy of harmonic scalpel (HS) versus bipolar diathermy (BD) in patients with third and fourth-degree prolapsed hemorrhoids undergoing hemorrhoidectomy. We found no significant differences between HS and BD regarding intraoperative morbidities, including operative time, intraoperative blood loss, hospital stay duration, and time to first bowel movement ($P > 0.05$). Additionally, postoperative pain on days 1, 3, and 7 showed no differences between the groups. The rates of postoperative complications—bleeding, urinary retention, anal stenosis, flatus incontinence, and wound edema—were also similar, with no significant differences ($P > 0.05$).

Conclusion: The current systematic review and meta-analysis of RCTs evaluated the efficacy and safety of HS in comparison with BD among patients with a third and fourth degree of prolapsed hemorrhoid and undergoing hemorrhoidectomy. The findings revealed there was no substantial difference between HS and BD in terms of intraoperative endpoints like operative time and intraoperative blood loss and postoperative endpoints like duration of hospital stay, duration of first bowel movement, pain, bleeding, anal stenosis, urinary retention, flatus incontinence, and wound edema.

Biography

Fatma M. AlDabbous, MD is a dedicated professional from the Department of Internship at the Kuwait Institute for Medical Specializations (KIMS) in Kuwait City, KWT, plays a pivotal role in supporting and guiding medical interns through their training programs. Her work focuses on enhancing medical education, developing internship curricula, and ensuring high standards in medical training, contributing to the overall development of healthcare professionals in Kuwait. Fatma's commitment to excellence in medical education makes her an integral part of KIMS's mission to nurture the next generation of healthcare leaders.