

Short Review Article

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Optimising Postoperative Pain in Laparoscopic Incisional Hernia Repair: Analgesic Insights from the TACKoMesh Randomised Trial

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Abstract

Postoperative pain remains a significant challenge following laparoscopic intraperitoneal onlay mesh with primary fascial closure (IPOM+) repair, with important implications for early mobilisation, functional recovery, and patient satisfaction. The TACKoMesh randomised controlled trial compared absorbable and non-absorbable tack fixation under a rigorously standardised multimodal analgesic protocol incorporating routine laparoscopic transversus abdominis plane (TAP) blocks. Although no difference was observed in pain on activity at 30 days between fixation methods, the trial provides valuable insight into early postoperative pain trajectories when anaesthetic variability is controlled. Procedure-specific evidence supports the role of TAP block in reducing early postoperative pain after laparoscopic ventral and incisional hernia repair, with effects that appear time-limited and converge as recovery progresses. This narrative review summarises the analgesic insights arising from TACKoMesh, examines the contribution of intra-operative regional analgesia to postoperative pain modulation in IPOM+ repair, and considers the implications for optimising perioperative pain management and the design of future pain-focused surgical trials.

Postoperative pain remains a significant challenge following incisional hernia repair, with direct implications for early mobilisation, functional recovery, length of stay, and patient satisfaction¹. Despite advances in minimally invasive techniques, pain following laparoscopic intraperitoneal onlay mesh with primary fascial closure (IPOM+) continues to represent a clinically relevant issue, arising from a combination of port-site trauma, fascial closure, mesh fixation, and pneumoperitoneum-related stretch. As IPOM+ has become increasingly adopted, attention has shifted from technical feasibility alone towards optimisation of perioperative care pathways, particularly analgesic strategy.

Multimodal analgesia, incorporating regional analgesia techniques, has emerged as a cornerstone of contemporary perioperative analgesic strategy in abdominal wall surgery. Among these, the transversus abdominis plane (TAP) block has gained prominence for its ability to reduce somatic abdominal wall pain by targeting the thoracolumbar nerves supplying the anterior abdominal wall. Procedure-specific evidence supports its role in ventral and incisional hernia repair, with matched-pair analyses demonstrating a reduction in early postoperative pain following TAP block, particularly within the first 24–48 hours after surgery. The duration of effect, however, is influenced by local anaesthetic selection and adjunct use; longer-acting agents or pharmacologic

additives within a multimodal analgesic framework may extend block efficacy beyond this early window, and should be considered when designing perioperative protocols³. However, these benefits appear time-limited, with pain trajectories converging as postoperative recovery progresses, underscoring the importance of interpreting analgesic effects within a temporal framework.

Within this context, the TACKoMesh randomised controlled trial provides valuable, methodologically robust evidence by comparing absorbable and non-absorbable tack fixation under a rigorously standardised perioperative analgesic protocol that included routine laparoscopic TAP blocks². By controlling for anaesthetic variability, the trial offers a unique opportunity to examine postoperative pain trajectories in the setting of consistent regional analgesia and to distinguish the relative contributions of fixation method and perioperative analgesic strategy. This review is therefore presented as a focused narrative synthesis anchored around insights from the TACKoMesh trial rather than a comprehensive systematic overview of the entire field.

A key strength of TACKoMesh lies in the universal use of the laparoscopic TAP block, delivered under direct vision using lignocaine. TAP blocks reduce somatic pain by targeting the nerves supplying the anterior abdominal wall⁴⁻⁶, and the laparoscopic approach allows direct visualisation of abdominal wall infiltration planes; however, comparative accuracy between laparoscopic and ultrasound-guided techniques remains debated, and both methods demonstrate operator dependency that may influence analgesic effectiveness. This is particularly beneficial in IPOM+ repairs, where early pain commonly arises from port-site trauma, fascial closure, and tack penetration. By applying the TAP block consistently to all cases, the trial minimised variability in analgesic technique and strengthened attribution of postoperative pain differences to the fixation method rather than perioperative analgesic management inconsistencies.

TACKoMesh found no significant difference in pain on activity at day 30 between absorbable and non-absorbable tacks². This aligns with prior evidence suggesting that fixation method contributes minimally to medium-term pain following laparoscopic ventral or incisional hernia repair¹. Both groups demonstrated a similar pain trajectory: a postoperative day-one peak, rapid decline by day six, and further improvement by day thirty, with only a minority reporting persistent rest pain at one year². This pattern reflects typical somatic recovery and likely indicates the beneficial influence of the trial's multimodal analgesic regimen, particularly the TAP block⁴⁻⁶.

A transient reduction in rest pain on postoperative day one was observed in the absorbable tack group². Although

statistically significant, this effect did not persist, suggesting that mechanical or inflammatory differences between tack types exert only short-lived effects on nociception. The convergence of pain scores by day six reinforces that early postoperative pain is predominantly shaped by surgical technique and perioperative analgesic strategy rather than fixation device characteristics. Recent prospective evidence in laparoscopic surgery further supports this interpretation, demonstrating that standardised perioperative protocols and modern operative techniques reduce early inflammatory and mechanical nociceptive burden and are primary determinants of recovery trajectories⁷. This aligns with the multifactorial nature of postoperative discomfort, which reflects the combined influence of fascial tension, port-site trauma, pneumoperitoneum, and patient-specific sensitisation rather than isolated device-related factors.

Several conclusions arise from these findings. First, multimodal analgesia—particularly regional techniques, should remain central to postoperative pain management in abdominal wall surgery. The consistent early pain reduction seen across both arms highlights the value of standardising TAP block use for IPOM+ procedures^{2,5}. Second, the study underscores the need to standardise postoperative pain measurement. Pain fluctuates rapidly in the early postoperative period, and reliance on isolated timepoints limits comparability across studies². Multi-timepoint reporting and harmonised assessment frameworks would enhance interpretability of future trials. Incorporation of validated assessment tools — including visual analogue scales (VAS), numeric rating scales (NRS), and movement-evoked pain scoring frameworks — may provide more reproducible and clinically meaningful evaluation of postoperative discomfort, particularly when attempting to differentiate focal fixation-related tenderness from global recovery-associated pain. TACKoMesh, the results confirm that device choice alone cannot meaningfully reduce postoperative pain, which arises from multifactorial influences including fascial tension, port-site trauma, pneumoperitoneum, and patient-specific factors such as preoperative pain or sensitisation^{1,6}.

Conclusion

While the TACKoMesh trial demonstrated no difference in pain at 30 days between absorbable and non-absorbable tack fixation, its methodologically robust integration of standardised multimodal analgesia—particularly the routine use of laparoscopic TAP block—provides important insight into postoperative pain mechanisms following laparoscopic IPOM+ repair². These findings reinforce that effective pain management in abdominal wall reconstruction is driven primarily by perioperative analgesic strategy, surgical execution, and individual patient factors rather than fixation device choice alone. However, a critical unresolved challenge for future

research is how best to characterise and quantify pain arising from tack fixation, which inherently involves focal invagination of the abdominal wall and interaction with richly innervated musculo-fascial structures. Traditional pain endpoints, particularly isolated time-point measures, may be insufficiently sensitive to capture this spatially localised and mechanically mediated component of pain. Future studies should therefore incorporate structured regional analgesia protocols, harmonised multi-timepoint pain assessment, and more granular outcome measures capable of distinguishing fixation-related pain from global postoperative discomfort. In particular, integration of dynamic pain assessment during movement — such as coughing, truncal flexion, positional transition, or ambulation — may better capture mechanically evoked focal tenderness associated with mesh fixation. Combining these approaches with anatomically localised pain mapping and patient-reported descriptors of tenderness intensity or quality would provide a more sensitive framework for characterising spatially localised nociceptive phenomena that traditional static endpoints may fail to detect. Such methodology may offer improved mechanistic resolution for future pain-focused surgical trials.

Conflict of Interest

There are no conflicts of interest in this article.

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