MANAGEMENT OF BURST ABDOMEN BY NEGATIVE PRESSURE THERAPY VERSUS DIRECT SKIN CLOSURE: A RANDOMIZED CONTROLLED TRIAL

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INTRODUCTION

Burst abdomen, or abdominal wound dehiscence, involves partial or complete disruption of the abdominal wall, often leading to serious complications like morbidity, prolonged hospitalization, and high healthcare costs. Proper understanding of abdominal wall anatomy-including skin, fascia, muscles, blood supply, lymphatics, and innervations-is essential for effective surgical management. Burst abdomen incidence varies from 0.2% to 12%, influenced by patient comorbidities, surgical technique, and emergency versus elective procedures. Risk factors include malnutrition, diabetes, anemia, steroid use, and peritonitis. Management strategies are categorized into non-operative measures and multiple operative techniques under temporary abdominal closure (TAC). Options include Bogota bag, Wittmann Patch, skin-only closure, simple packing, mesh applications, and vacuum-assisted closure (VAC). Among these, VAC therapy has gained prominence for promoting granulation tissue, reducing edema, enhancing bacterial clearance, and accelerating wound healing. However, despite promising results, few studies have directly compared VAC therapy and conventional methods like skin closure in post-laparotomy wound dehiscence, justifying the need for this study.

AIM OF THE WORK

This randomized controlled trial aims to compare the outcomes of negative pressure therapy (using VAC) versus direct skin closure in the management of burst abdomen regarding efficacy and safety.

The primary endpoint is the rate of definitive aponeurotic closure. There are multiple secondary points such as intraoperative complications, timing of aponeurotic closure, rate of development of incisional hernia, rate of reoperation, severe post operative morbidity including enterocutaneous fistulae, incidence of abdominal compartment syndrome, length of hospital stays, readmission, postoperative mortality.

SUBJECTS AND METHODS

Patients presenting with burst abdomen who consented to participate were included, while those unfit for surgery or who refused either intervention were excluded. Comprehensive preoperative assessments included history taking, physical examination including ASA score (American Society of Anaesthesiologists (ASA) Physical Status Classification System) and defect size, laboratory workup (CBC and serum albumin), and abdominal-pelvic CT imaging.

Patients were randomized into two groups-VAC therapy or direct skin closure-using REDCap® software, stratified by sex, age group, and ASA score. All surgeries were performed under general anesthesia. In the direct skin closure group, interrupted Prolene sutures were used with standard dressings. VAC therapy involved applying silicone sheets to protect underlying bowel, polyurethane foam dressings, and controlled negative pressure (-50 to -75 mmHg). Dressing changes occurred every three days until definitive aponeurotic closure. Detailed intraoperative data, postoperative complications, urine output, intra-abdominal pressure, and hospital stay length were recorded. Patients were followed at one and three months postoperatively to assess primary and secondary outcomes.

RESULTS

Table 1: Direct Skin Closure vs. VAC Therap

Characteristic	Direct Skin Closure	VAC Therapy	P value
Gender (male)	38.89%	59.26%	0.2307
Gender (female)	61.11%	40.74%	0.2307
Age (Mean±SD)	50.4 ± 12.6	49.4 ± 9.5	0.776
ASA Score < 3 (n)	18	22	0.146
ASA Score ≥ 3 (n)	0	5	0.146
Smokers (%)	33.3%	48.1%	0.499
Defect Size (Mean±SD)	5.0 ± 2.1	4.5 ± 3.6	0.560
Hemoglobin (Mean±SD)	9.7 ± 1.0	10.1 ± 1.4	0.270
Albumin (Mean±SD)	2.46 ± 0.27	2.65 ± 0.38	0.0622

Table 2: Intra-Abdominal Pressure Summary

Group	Session	Mean Pressure (mmHg)	Std Dev	Median Pressure (mmHg)	IQR Pressure
Direct Skin Closure	1	12.5	2.1	12.0	1.5
Direct Skin Closure	2	11.7	2.3	11.5	1.2
Direct Skin Closure	3	11.0	1.9	10.9	1.0
VAC Therapy	1	10.5	1.7	10.3	1.0
VAC Therapy	2	10.0	1.6	9.9	1.1
VAC Therapy	3	9.5	1.4	9.3	1.0

Normal intrabdominal pressure → 5-7 mmHg, above 12 mmHg is considered intrabdominal hypertension. 8-11 mmHg is elevated but still subclinical

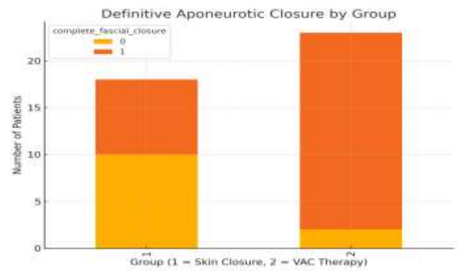

Figure 1
Definitive aponeurotic closure was achieved by the end of 3 months postoperative
0 → failure to achieve definitive aponeurotic closure
1 → successful aponeurotic closure

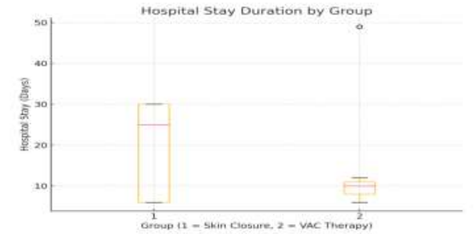

Figure 2

CONCLUSION

This study reinforces the superiority of VAC therapy over direct skin closure in managing burst abdomen. By achieving higher rates of definitive aponeurotic closure, reducing hospital stays, and minimizing complications, VAC therapy demonstrates significant clinical benefits. However, cost considerations and the need for standardized protocols remain critical for its widespread adoption. Integrating these findings into clinical practice requires collaboration among healthcare providers, policymakers, and researchers to ensure optimal patient outcomes and resource allocation.