Trends in Clinical and Medical Sciences

PSR Press

Article

A randomized control study to determine risk of surgical site infection after prophylactic negative pressure wound therapy for closed surgical incisions in a tertiary care centre of central India

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Received: 2 February 2023; Accepted: 5 May 2023; Published: 26 May 2023.

Abstract: Background and Aim: Surgical site infections (SSIs) are common after laparotomy wounds and are associated with a significant economic burden. The use of negative pressure wound therapy (NPWT) has recently been broadened to closed surgical incisions.
Material and Methods: The Institutional Ethics Committee approved this single-center, parallel, randomised controlled trial, which followed the Declaration of Helsinki. If they were 18–65 year old , patients were eligible. All surgery patients undergoing abdominal surgery and closed abdominal surgical wounds who received negative pressure wound therapy or conventional therapy. Exclusion criteria included abdominal pathology re-explored or re-operated and inability to consent. Trial participants received an information leaflet and gave written consent.
Result: The primary objective to assess the relative risk of development of SSI in the ciNPWT, the relative risk of development SSI in CiNPWT group was found to be 0.69 and 1.44 in group with conventional dressing, thus CiNPWT was found to be protective for SSI in incisional wound. CiNPWT and conventional patients were mostly 31-60 years old. 84 patients (70%) were male, while 36 (30%) were female in the study cohort.NPWT reduced wound complications like soakage and dehiscence by 20% on the 14th day after surgery. A 0.013 p-value indicated statistical significance. NPWT reduced wound complications like soakage and dehiscence on the 21st day after surgery. The 18.33% reduction was statistically significant at 0.0134. Negative Pressure Wound Therapy (NPWT) reduced soakage and dehiscence by 10% in serial follow-ups on the 30th day post-surgery. The study revealed a negative correlation between the levels of Total Serum Protein and Serum Albumin and both wound healing duration and duration of hospital stay. Specifically, lower levels of total protein and albumin were associated with longer healing time and extended hospitalisation.
Conclusion: Surgical site infections are common, especially in high-risk patients. SSI costs hospitals a lot. SSI research is underway. This study used Negative Pressure Wound Therapy (NPWT) as a prophylactic dressing for closed incisional wounds in 60 patients and compared its efficacy to conventional dressings. Based on relative risk analysis, CiNPWT prevented SSI after one year. NPWT significantly reduced seroma formation. Negative Pressure Wound Therapy (NPWT) shortened wound healing and hospitalisation. Negative pressure wound therapy (NPWT) reduced wound complications like dehiscence, blistering, necrosis, and reoperation or rehospitalization. These findings were not statistically significant. NPWT reduced SSI.

Keywords: General Surgery; Negative Pressure Wound Therapy; Surgical Site Infections.

1. Introduction

Surgical incisions refer to a disruption in the skin's integrity, which serves as a barrier against the migration of infectious agents into the underlying tissues[1]. The process of healing an incisional

wound involves a multifaceted sequence of biological and molecular events, including cellular migration, proliferation, and extracellular matrix storage and remodelling. Several pathophysiological and metabolic factors have the potential to alter the process of wound healing, leading to potential impairment or delay in the healing process. In the sterile environment of the operating room, it is imperative to apply a sterile dressing to cover and isolate the incisions. Historically, cotton gauze has been the primary material utilised for wound care and dressing, and it remains a prevalent choice in contemporary medical practise [2]. Gauze is a cost-effective material that is utilised for the management of uncomplicated wounds. It functions by absorbing exudate and maintaining a clean and covered wound bed. According to Winter's 1962 report, wounds that are kept moist exhibit a faster rate of healing in comparison to those that are exposed to air. This singular observation had a profound impact on the domain of wound management and played a significant role in the development of the vast array of products that are currently at the disposal of healthcare professionals. The principles of maintaining wound cleanliness, moisture, and appropriate debridement have become fundamental tenets in the field of wound care. The present iteration of sterile protective dressings has undergone several decades of development. These dressings comprise a non-adherent dressing that contains antimicrobial agents. They are further covered with sterile abdominal pads or gauze and secured using tapes or clear film. Argenta and Morykwas addressed a significant number of intricate wounds during the initial years of the 1990s and made efforts to devise an improved approach to treatment [3,4].

The researchers developed several prototypes to facilitate wound healing by exploring the possibility of utilising suction to promote the approximation of wound edges. The most clinically successful method entails the insertion of open-pore polyurethane foam into the wound, followed by the application of a semi-occlusive dressing and connection to a vacuum source via a tube. The aforementioned method was identified as negative pressure wound therapy (NPWT). According to Argenta and Morykwas, the aforementioned device has revolutionised the treatment of numerous intricate wounds and has become the conventional approach for managing such wounds in acute care environments [3,4].

Over the course of the last twenty years, the utilisation of vacuum-assisted closure, also known as negative pressure wound therapy (NPWT) or microdeformational wound therapy, has led to substantial advancements in the field of wound care [5]. Negative pressure wound therapy (NPWT) has been widely implemented in hospitals worldwide as an effective treatment for acute, chronic, and intricate wounds, and has become a crucial element of modern wound management practises [1]. Presently, a substantial body of research exists that showcases the benefits of utilising negative pressure dressing for managing open wounds. The Incisional Negative Pressure Wound Therapy (INPWT) technology, available through the PrevenaTM (KCI USA, Inc., San Antonio, TX) and Pico (Smith & Nephew Inc., Andover, MA) systems, has recently been the focus of research exploring its potential as a preventative measure for applying NPWT on closed incisions.In this study, we utilised Negative Pressure Wound Therapy (NPWT) as a prophylactic dressing on a closed abdominal incision wound immediately following surgery. The objective was to evaluate the impact of NPWT on the healing of surgical sites and the reduction of surgical site infections.

2. Material and methods

This single-centre, parallel, randomized controlled trial was performed in accordance with the provisions of the Declaration of Helsinki and ethical approval was obtained from the Institutional Ethics Committee. Patients between 18 and 65 years old were eligible for inclusion if they All patients admitted in department of surgery with need of abdominal surgery followed by closed abdominal surgical wounds and who received either negative pressure wound therapy or conventional therapy. Exclusion criteria comprised previous operated for abdominal pathology and needs re-operationand not ready to give consent. Patients were provided with an information leaflet and written, informed consent was obtained from all participants in the trial. Allocation for the trial was determined using a computer-generated random number sequence. Randomization was allocated by an individual who was not involved in recruitment or intervention within the trial. Patients undergoing dressing following abdominal surgery was enrolled as per inclusion criteria excluding the others. Consent was taken from the patients after explaining the full complications of the abdominal procedure and requirement of serial dressing following the procedure with a regular follow-up. Written informed consent has been taken from every patient and has been informed about this publication of case report. The study has been approved by our research and ethical committee. Patients' identity was kept

confidential. All the patient underwent detailed history taking, examination and all the required investigation. As per the surgical protocol patients underwent exploratory laprotomy following which the midline incision was closed primarily and dressing was done either using conventional dry dressing or by applying negative pressure dressing. In NPWT a protective layer of ioban was applied over the abdomen with a window for incision wound. A protective layer of chlorhexidine gauzewas directly placed over the incision wound over which microporous sponge with suction drain was placed. A negative suction was connected to the drain maintaining a negative pressure of 125mmHg. Serial follow up of collection from the suction wound was noted. Negative pressure dressing was removed after post operative day 3and switched to conventional dry dressing after post-operative day 3. Regular dressing change was done and wound complication if any was noted. Patient was followed on post operative day 14, 21 and 30. Throughout the study the standard parameter i.e., study variable was noted down in working proforma. In conventional group regular dressing of the wound was done using Poiviodine Iodine ointment and Dry gauze pieces. Regular change of dressing was done on daily basis.

3. Results

The study involved 900 students in total, of which 408 (45.33%) were men and 492 (54.66%) were women. The mean age was 20.42 years and 1.38 years, with the age range being 17 to 25 years.

Particular	**Sub- Particular**	**CiNPWT group**		**Conventional group**	
		N	**%**	**N**	**%**
Age Group	18-30 years	7	11.67%	11	18.33%
	31-45 years	25	41.67%	24	40.00%
	46-60 years	23	38.33%	21	35.00%
	61-65 years	5	8.33%	4	6.67%
Sex	Female	16	26.70%	20	33.30%
	Male	44	73.30%	40	66.70%
Diagnosis	Small Bowel (Perforation/ stricture/ obstruction)	16	26.67%	18	30.00%
	Prepyloric Perforation	9	15.00%	11	18.33%
	Liver pathology (Abscess/ Injury)	5	8.33%	3	5.00%
	Appendicular Pathology (Abscess/Perforation/Mass)	4	6.67%	4	6.67%
	Large Bowel Pathology	4	6.67%	2	3.33%
	Koch's Abdomen	4	6.67%	6	10.00%
	Sigmoid Pathology (Carcinoma/ Volvulus)	4	6.67%	4	6.67%
	Blunt Trauma Abdomen	3	5.00%	5	8.33%
	Stab Injury abdomen	3	5.00%	3	5.00%
	Obstructed Hernia	2	3.33%	0	0.00%
	Splenic Laceration	2	3.33%	1	1.67%
	Urinary Baldder Rupture	2	3.33%	2	3.33%
	Gangrenous Gall Bladder	1	1.67%	0	0.00%
	Periampullary Carcinoma	1	1.67%	1	1.67%
Underlying Comorbidities	Diabetes	14	23.33%	15	25.00%
	COPD	4	6.67%	3	5.00%
	HTN	6	10.00%	8	13.33%
	PVD	2	3.33%	1	1.67%
Surgical Site Infection	Yes	15	25.00%	22	36.67%
	No	45	75.00%	38	63.33%
Relative Risk		0.69		1.44	

CiNPWT and conventional patients were mostly 31–60 years old. 84 patients (70%) were male, while 36 (30%) were female in the study cohort.60 CiNPWT patients were analysed by diagnosis. Small bowel pathology—perforation, stricture, or obstruction—occurred in 26.67% of patients. 15% had prepyloric perforation, while 8.33% had liver pathology like abscess or laceration. Appendicular pathology—abscess, perforation, or mass—occurred in 6.67% of patients. Koch's abdomen and large bowel pathology occurred in 6.67% of patients. 6.67% had sigmoid pathology, including carcinoma

or volvulus. Patients had 5.0% blunt trauma abdomen and 5.00% stab injury abdomen. 3.33% of patients had umbilical or inguinal hernia, splenic laceration, or urinary bladder rupture. Gangrenous gall bladder and periampullary carcinoma each affected 1.67% of patients.Analysed patient diagnosis distribution. 18 (30.00%) of 60 Conventional patients had small bowel pathology like perforation, stricture, or obstruction. 11 patients (18.33%) had prepyloric perforation, 3 (5.0%) had liver pathology like abscess or laceration, 4 (6.67%) had appendicular pathology like abscess, perforation, or mass, and 2 (3.33%) had large bowel pathology. 6 patients (10.0%) had Koch's abdomen, 4 (6.67%) had sigmoid pathology like carcinoma or volvulus, 5 (8.33%) had blunt trauma abdomen, 3 (5.00%) had stab injury abdomen, 1 (1.67%) had splenic laceration, 2 (3.33%) had urinary bladder rupture, and 1 (1.67%) had periampullary carcinoma.The distribution of patients based on comorbidities revealed that 14 patients in the CiNPWT group and 15 patients in the conventional group had diabetes. Additionally, 4 patients in the CiNPWT group and 3 patients in the conventional group had COPD, while 6 patients in the CiNPWT group and 8 patients in the conventional group had hypertension. Furthermore, 2 patients in the CiNPWT group and 1 patient in the conventional group had PVD.- The study revealed that the CiNPWT group exhibited a relative risk of 0.69 for the development of SSI, indicating a protective effect against surgical site infection. Conversely, the group utilising conventional dressing demonstrated a relative risk of 1.44 for SSI, signifying an elevated risk of infection with the use of conventional dry dressing.The study revealed a decrease in surgical site infections (SSI) by 11.67% among the group that received CiNPWT (25.0%) compared to the conventional group (36.67%). However, the statistical analysis indicated that the correlation was not significant.

Particular		CiNPWT group		Control group		Chi-square	p-value
Sokage/ Dehiscence		Count	Percentage N %	Count	Percentage N %		
14 days	Yes	10	16.67%	22	36.67%	6.136	0.013*
	No	50	83.33%	38	63.33%		
21 days	Yes	7	11.67%	18	30.00%	6.11	0.0134*
	No	53	88.33%	42	70.00%		
30 days	Yes	4	6.67%	10	16.67%	2.911	0.08
	No	56	93.33%	50	83.33%		
Seroma/Hematoma Formation	Yes	18	30.00%	38	63.30%	13.393	0.000*
	No	42	70.00%	22	36.70%		
Dehiscnce	Yes	20	33.30%	29	48.30%	2.794	0.095
	No	40	66.70%	31	51.70%		
Skin Blistering / Necrosis	Yes	10	16.70%	16	26.70%	1.768	0.184
	No	50	83.30%	44	73.30%		
Re-operation/ Re-hospitalizationn	Yes	8	13.30%	12	20.00%	0.96	0.327
	No	52	86.70%	48	80.00%		

* p-value <0.05 is considered significant

NPWT reduced wound complications like soakage and dehiscence by 20% on the 14th day after surgery. A 0.013 p-value indicated statistical significance.NPWT reduced wound complications like soakage and dehiscence on the 21st day after surgery. The 18.33% reduction was statistically significant at 0.0134.Negative Pressure Wound Therapy (NPWT) reduced soakage and dehiscence by 10% in serial follow-ups on the 30th day post-surgery. The difference was not significant (p-value 0.08).- The conventional group had 63.30% (38 out of 60 patients) seroma/hematoma, while the CiNPWT group had 18 out of 60. CiNPWT reduced seroma formation by 33.30% (p-value <0.05). iNPWT reduced wound dehiscence by 33.30% compared to 48.30% in the conventional group, a 15% reduction. Skin blistering/necrosis was 16.70% in iNPWT and 26.70% in conventional, a 10% reduction. CiNPWT reduced the re-operation/re-hospitalization rate by 6.7%, from 13.30% to 20.0%. Results were not statistically significant.

Particular	**Sub-Particular**	**CiNPWT Group**	**Control Group**
Addiction Habit	Smoking	28.33%	20.00%
	Alcoholic	13.33%	18.33%
	Alcoholic/ Smoking	3.33%	5.00%
	Tobacco	20.00%	13.33%
	Tobacco/ smoking	3.33%	1.67%
	Alcohol, Smoking, Tobacco	1.67%	1.67%
	No	30.00%	40.00%
Hospital Stay	Wound Healing Time (days)	9.07	11.87
	Hospital Stay (days)	10.98	13.93

The study findings indicate a noteworthy decrease of 2.93 days in the duration of wound healing among patients who underwent CiNPWT treatment, with a mean of 9.07 days and a standard deviation of 2.28 days. In contrast, patients in the conventional group exhibited a mean of 12 days and a standard deviation of 3.31 days. The statistical analysis revealed

a significant correlation between the variables, as indicated by a p-value of less than 0.05. The study findings indicate a noteworthy decrease of 3.02 days in the length of hospitalisation for patients who received CiNPWT, with a mean of 10.98 days and a standard deviation of 2.84 days. In comparison, patients in the conventional group had a mean of 14 days and a standard deviation of 3.86 days. The statistical analysis revealed a significant correlation between the variables, as indicated by a p-value of less than 0.05.

Particular		**S. Albumin (g/dl)**	**Total Protein (gm/dl)**
Wound Healing Time (days)	Pearson Correlation	-.488** Negative correlation	-.521** Negative correlation
	P-value	0.000	0.000
	N	120	120

The study revealed a negative correlation between the levels of Total Serum Protein and Serum Albumin and both wound healing duration and duration of hospital stay. Specifically, lower levels of total protein and albumin were associated with longer healing time and extended hospitalisation.

4. Discussion

This randomised controlled study was conducted at the Department of Surgery of M.G.M Medical College and M.Y Hospital. The study included all patients who underwent surgery for abdominal pathology at the aforementioned institution over a period of one year. Patients diagnosed with abdominal pathology and scheduled to undergo exploratory laparotomy will necessitate the application of a dressing to the incision site. Two dressing options were presented to the patients, namely conventional dry dressing utilising povidone iodine ointment and gauze, or negative pressure wound therapy administered over the closed incision wound. Subsequent and routine wound dressing was conducted with meticulous monitoring of potential complications, and any observed issues were duly recorded.

The study comprised a predominant number of patients within the age range of 31-45 years, with the subsequent highest representation being patients aged between 46-60 years, in both the control and CiNPWT groups. A study was conducted by Milena Pachowsky and colleagues [6], wherein 19 patients were subjected to randomization. Ten days post-surgery, it was observed that group A (n=10, mean age=70.5 ± 11.01 years) exhibited seromas with an average volume of 5.08 ml, while group B (n=9, mean age=66.22 ± 17.83 years) had an average volume of 1.97 ml. The difference in seroma volume between the two groups was statistically significant (p=0.021). The application of negative pressure wound therapy (NPWT) resulted in a noteworthy decrease in the incidence of seroma formation.The gender distribution of patients indicates that a majority of 44 individuals (73.30%) in the CiNPWT group and 40 individuals (66.70%) in the conventional group were male. The remaining 16 individuals (26.70%) in the CiNPWT group and 20 individuals in the conventional group were female.In the current investigation, it was observed that the CiNPWT group exhibited a relative risk of 0.69 for the development of SSI, whereas the conventional dressing group had a relative risk of 1.44. Therefore, it can be concluded that CiNPWT has a protective effect against SSI. In a multi-center study on incisional negative pressure wound therapy aimed at reducing surgical site infection, A M Di Re, D Wright et al. [7] examined a total of 124 patients, with 61 patients receiving NPWT and 63 patients serving as controls. A total of 109 individuals underwent colorectal surgery and the incidence of surgical site infections (SSIs) was observed to be higher in the control group as compared to the negative pressure wound therapy (NPWT) group. However, the difference was not found to be statistically significant (20.6% in the control group vs. 9.8% in the NPWT group, p-value = 0.10). The control group exhibited a heightened susceptibility to surgical site infections (SSI). The incidence of superficial non-surgical site infection (SSI) wound dehiscence was found to be significantly lower in the negative pressure wound therapy (NPWT) group compared to the control group, with a rate of 0% and 9.5%, respectively (P=0.03). The utilisation of negative pressure wound therapy (NPWT) was examined by Stannard and colleagues (2012) in order to prevent wound dehiscence and infection following high-risk lower extremity fractures [8]. The study was designed as a multicenter, prospective, randomised, controlled trial and involved a total of 249 patients with 263 fractures. Following the procedure of open reduction and internal fixation of the fracture, the patients were subjected to randomization, with one group receiving standard postoperative dressings (control group; n=122 fractures) and the other group receiving negative pressure wound therapy (NPWT) (n=141 fractures) at the surgical incision site [9]. The study findings indicate that the incidence of infections in the NPWT group was 9.7% of fractures, while the control group reported 19% of fractures. The difference in infection rates between the two groups was statistically significant (p=0.049), as illustrated in Figure 2. The study findings indicate that the control patients had a 1.9 times higher risk of developing infection compared to the NPWT-treated patients. The 95% confidence interval for this relative risk was 1.03-3.55. The study findings indicate that the NPWT group exhibited a noteworthy decrease in the likelihood of post-hospital wound dehiscence, with only 8.6% of fractures experiencing this outcome, as opposed to the control group where 16.5% of fractures experienced wound dehiscence. This difference was statistically significant ($p < 0.044$) [10]. In the current investigation, the average age of patients in the CiNPWT group was found to be 44.7 years with a standard deviation of 12.5, while the mean age in the conventional group was 43.06 years with a standard deviation of 12.62 years. The mean BMI of the individuals in the CiNPWT cohort was 21.62kg/m2, while the corresponding figure

for the conventional group was 21.50 kg/m2. Between September 2010 and September 2014, V Sreenath Seenu Reddy et al. [11] administered CiNPWT treatment to a total of 27 patients. The study participants had a mean age of 62.5 years with a standard deviation of 7.9. The mean body mass index (BMI) was 38.5 kg/m2 with a standard deviation of 4.4. The average duration of continuous negative pressure wound therapy (CiNPWT) was found to be 5.6 days, with a standard deviation of 0.9 days. Seventy-seven point eight percent (77.8%) of the patients (n=27) exhibited good redivision with an intact incision within a period of 30 days post-surgery. Two patients experienced minor dehiscence. The four instances of surface-level cellulite were effectively addressed and remedied. One patient who presented with cleaving was rehospitalized for intravenous administration of antibiotics, while five other patients were effectively treated with antibiotics in an outpatient setting. At the final follow-up, it was observed that all patients exhibited intact incisions with satisfactory skin approximation.The study findings indicate that a higher proportion of patients in the conventional group (63.30%) experienced seroma/hematoma formation compared to the CiNPWT group, where only 18 out of 60 patients were affected. The application of CiNPWT resulted in a statistically significant decrease (33.30%) in the occurrence of seroma formation (p-value <0.05). According to Stannard et al. [12], there was a prevalence of drainage ranging from minor to major from surgical incisions. Regrettably, the nature of the drainage, whether it was seroma or hematoma, was not explicitly indicated. Nonetheless, the utilisation of INPWT resulted in a noteworthy decrease in the frequency of days featuring mild discharge from the incision in comparison to conventional desiccation, as per their findings. The application of a bandage for either 1.8 or 4.8 days resulted in a statistically significant difference (P=0.02). Condegreen et al. [13] and Blackham et al. [14] were the sole authors to document the incidence of hematoma. According to Condegreen et al., there was no reported incidence of hematoma in either the INPWT group or the CG group.

The incidence of seromas in the control group (CG) of INPWT was found to be 12% (n=4) out of a total of 70 cases. In contrast to prior research, Blackham documented three instances (3.4%) of seroma in the INPWT group compared to four cases (3.8%) in the control group, with no statistically significant difference between the two groups (P=0.867, OR 0.85, 95% CI 0.13–5.49). Notably, these cases were observed in the category of cleanly contaminated cases. The incidence of seroma was found to be 4.8% in the CG group and 4% in the INPWT group (P=0.867, OR 0.85, 95% CI 0.13-5.50). The occurrence rate of Hematoma was recorded as 2.3% in the Control Group, whereas no cases were reported in the INPWT Group. Among the cleanly contaminated cases, the incidence rate was 1.6% in the CG and none in the INPWT group, with a total of 71 cases.The current investigation revealed a decrease in wound dehiscence of 33.30% in the iNPWT group compared to a reduction of 48.30% in the conventional group, resulting in a 15% decrease. Similarly, skin blistering/necrosis was reduced by 10% in the iNPWT group, with a rate of 16.70%, compared to 26.70% in the conventional group. The re-operation/re-hospitalization rate was also reduced by 6.7% in the iNPWT group, with a rate of 13.30%, compared to 20.0% in the conventional group. However, these findings were not statistically significant following the application of CiNPWT.

The study conducted by Condegreen et al. [13] demonstrated that the dehiscence rate was significantly lower with the use of INPWT (87%, n=2) compared to conventional dry dressing (39%, n=13) with an odds ratio of 6.83, 95% confidence interval: 1.3-34.1, and a p-value of 0.014. Similarly, Stannard et al. [15] (1971) found that the use of INPWT resulted in a lower dehiscence rate of 8.6% (n=12) compared to 16.5% (n=12) with conventional bandages.The sample size for this study was 20. The relative risk was found to be 1, with a 95% confidence interval ranging from 1.03 to 3.55 and a p-value of 0.044. The study conducted by Condegreen et al. revealed that there was no statistically significant variation in skin necrosis between the groups treated with INPWT and SDD (standard dry dressing) [13]. According to Vargo's findings, the group that received the INPWT treatment did not exhibit any instances of skin necrosis [16]. The authors Taube et al. According to a study [17], the reoperation rate was found to be around 23% (n=7/30) in the CG, while it was approximately 7% (n=1/15) in the INPWT group (P=0.631). The authors Grauhan et al. The study revealed that the reoperation rate was 7% (n=5) in the CG and 4% (n=4) in the INPWT group. P=0×72 [18].The study findings revealed a decrease in surgical site infections (SSI) by 11.67% among the group that received CiNPWT (25.0%) compared to the conventional group (36.67%). However, the statistical analysis indicated that the correlation was not significant. According to Blackham et al. [14], the use of negative pressure wound therapy (NPWT) was linked to a lower incidence of surgical site complications in patients who underwent colorectal, pancreatic, or cytoreductive surgery when compared to standard sterile dressings. The study found that the global infection rates were 16.3% for NPWT compared to 26.4% for standard dressings. Additionally, the incidence of superficial incisional surgical site infections (SSIs) was 6.7% for NPWT versus 19.5% for standard dressings (with a statistically significant difference of P=0.015), and the incidence of incisional SSIs was 11.5% for NPWT compared to 19.5% for standard dressings. The implementation of INPWT seems to provide the greatest advantage for procedures that are contaminated in a hygienic manner. The study revealed that the prevalence of infection in general was 16.0% compared to 35.5%. Additionally, the prevalence of superficial incision infection was 6.0% compared to 27.4%, and the prevalence of incision infection was 11.0% compared to 27.4%. Masden et al. conducted a study with the INPWT group and found a decreased occurrence of infection in comparison to conventional dry dressings. However, the outcomes did not attain statistical significance. There was no significant disparity observed in the duration taken for the onset of infection in the wound among the two groups [16]. The study revealed a noteworthy decrease of 2.93 days in the duration of wound

healing among patients who underwent CiNPWT treatment (with a mean of 9.07 days and a standard deviation of 2.28 days), in comparison to the conventional group of patients (with a mean of 12 days and a standard deviation of 3.31 days). The statistical analysis revealed a significant correlation, as evidenced by a p-value of less than 0.05. Stannard et al. (2006) conducted a randomised controlled trial which demonstrated a noteworthy decrease in the duration required to achieve a dry incision. The study demonstrated the utilisation of INPWT for high-risk leg fractures subsequent to internal fixation with open reduction, resulting in a statistically significant reduction in hospital stay duration (1.6 vs. 3.1 days, P = 0.03) [3].

5. Conclusion

Surgical site infections are a commonly occurring complication subsequent to a surgical intervention, particularly in patients who are at an elevated risk. The risk of Surgical Site Infections (SSI) imposes a significant financial burden on hospitals. Extensive research is currently being conducted to mitigate surgical site infections (SSI). The present investigation employed Negative Pressure Wound Therapy (NPWT) as an initial prophylactic dressing for closed incisional wounds in a cohort of 60 patients, and subsequently compared its efficacy with that of conventional dressings. Following a one-year study period, it was determined that CiNPWT demonstrated a protective effect against SSI based on the relative risk analysis. The utilisation of negative pressure wound therapy (NPWT) resulted in a noteworthy decrease in the incidence of seroma formation. The utilisation of Negative Pressure Wound Therapy (NPWT) resulted in a significant reduction in both wound healing time and hospitalisation duration. The utilisation of negative pressure wound therapy (NPWT) was observed to decrease the incidence of wound complications such as wound dehiscence, skin blistering, skin necrosis, and the need for reoperation or rehospitalization. However, the statistical significance of these findings was not established. The utilisation of NPWT resulted in a general reduction in SSI.

Author Contributions: "All authors contributed equally to the writing of this paper. All authors read and approved the final manuscript."

Conflicts of Interest: The authors declare no conflict of interests.

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