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ORIGINAL RESEARCH

A Comparative Study on Effectiveness of Commercial Suction Drain VS Indigenous Suction Drain in Reducing Seroma Formation in Post Mastectomy patients

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ABSTRACT

INTRODUCTION: A drain is a tube designed to facilitate the removal of fluid or air that may accumulate at a surgical site or within a wound. This drainage is crucial as it aids in the healing process by preventing fluid build-up, which can lead to infection or other complications. **AIMS AND OBJECTIVES:** The objective is to evaluate the efficacy of different suction drains in minimizing seroma development in patients following mastectomy. Additionally, the study aims to assess the effectiveness of a commercially available suction drain in decreasing seroma formation in post-mastectomy patients. **MATERIALS AND METHODS** A prospective non-randomised hospital-based observational study. Duration of Study: August 2022 - June 2024. **OBSERVATIONS AND RESULTS** This study is a prospective non-randomised hospital-based observational study conducted over a period of two years, from August 2022 to June 2024. It includes a total of 100 female patients who underwent modified radical mastectomy with drain insertion at MGM Warangal. **DISCUSSION**: In the Present study, there are a total of 100 cases. The ages range from a minimum of 35 to a maximum of 80, with an average age of 50. **CONCLUSION** Commercial suction drains are more effective than indigenous suction drains in reducing seroma formation post-mastectomy. The peak incidence of mastectomy cases is observed in the 41-50 age group, where the efficiency of commercial drains can provide significant benefits.

KEY WORDS Drain, mastectomy, seroma, suction Drain,

INTRODUCTION

A drain serves as a specialized conduit designed to facilitate the removal of fluids or air that may accumulate at a surgical site or within a wound[1]. This drainage is essential for promoting the healing process by preventing fluid buildup, which can lead to infections or other complications. The length of time a drain is utilized can differ based on the specific requirements of the patient and the nature of the surgery or wound[2]. An effective drain should possess several critical attributes. It must be rigid and smooth to avoid causing irritation to the surrounding tissues. Additionally, it should be made from a durable material that maintains its integrity over time and must remain free from obstructions to ensure uninterrupted drainage[3]. Various types of drains exist, categorized by their operational mechanisms. Open drains operate by gravity, allowing fluids to flow out naturally. Semi-open drains utilize capillary action to facilitate drainage. In contrast, closed drains employ suction to actively remove fluids from the wound site[4].

Drains can also be divided into active and passive categories. Active drains, such as Hemovac and Jackson-Pratt drains, use suction to maintain negative pressure, ensuring effective fluid removal. Passive drains, including nasogastric tubes and Foley catheters, do not use suction but rely on natural pressure gradients to promote drainage. A thorough understanding of these different types and their mechanisms is vital for effective post-operative care and achieving optimal patient outcomes[5]. This comparative study is motivated by the urgent need to enhance post-mastectomy patient care through cost-effective and efficient medical practices. In many developing regions, the high costs associated with commercial suction drains pose a significant barrier to

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their widespread use, leading healthcare providers to seek alternative solutions. Indigenous suction drains, being more affordable and readily available, present a promising alternative.

AIM AND OBJECTIVES AIM OF STUDY

The objective is to evaluate the efficacy of different suction drains in minimizing seroma development in patients following mastectomy. Additionally, the study aims to assess the effectiveness of a commercially available suction drain in decreasing seroma formation in post-mastectomy patients. Furthermore, the research will investigate the effectiveness of a locally developed suction drain in reducing seroma occurrence in this patient population.

MATERIALS AND METHODS

A prospective non-randomised hospital-based observational study. Duration of Study: August 2022 - June 2024. Sample Size A total of 100 patients who underwent modified radical mastectomy with drain in MGM Warangal. Inclusion and Exclusion Criteria Inclusion Criteria: Age greater than 15 and less than 65 years. Female patients. Patients who underwent modified radical mastectomy with drain being placed. Exclusion Criteria: Age less than 15 and greater than 65 years. Patients who underwent surgeries other than modified radical mastectomy.

OBSERVATIONS AND RESULTS

This research is a prospective, non-randomized observational study conducted in a hospital setting over a two-year timeframe, from August 2022 to June 2024. It involved a cohort of 100 female patients who underwent modified radical mastectomy with drain placement at MGM Warangal. The inclusion criteria encompassed female patients aged between 15 and 65 years who had the specified surgical procedure with a drain, while those excluded were patients younger than 15 or older than 65 years, as well as individuals who underwent surgeries other than modified radical mastectomy. Prior to their involvement, all participants provided written informed consent after being briefed on potential complications associated with drain insertion, including pain, occlusion, leakage, infection, and displacement. The participants were subsequently categorized into two groups according to the type of drain utilized. Following the surgery, all patients were observed for complications, and the duration until drain removal was documented. The age distribution of the patients indicated that the highest incidence of modified radical mastectomy cases with drain insertion was observed in the fourth decade of life, particularly among those aged 41 to 50 years, which accounted for 53% of the total patient population, making it the most prevalent age group.

Table 1: Demographic Distribution and Age-related Incidence in Mastectomy Patients

Age Group	Number of Patients	Percentage (%)
31-40	5	5%
41-50	53	53%
51-60	21	21%
61-70	17	17%
71-80	4	4%

The age of patients with peak incidence in the 4th decade of life ranging from 35 years to 80 years

The demographic distribution and age-related incidence of mastectomy patients reveal notable trends within the study population. The data indicates that the highest incidence of mastectomy occurs in the 41-50 age group, accounting for 53% of the total cases. This suggests that the peak incidence is in the 4th decade of life. Specifically, out of the total patients, 53 fall within the 41-50 age bracket. This is followed by the 51-60 age group, which constitutes 21% of the patients, equivalent to 21 individuals. The 61-70 age group accounts for 17% of the patients, with 17 cases. Younger patients aged 31-40 represent 5% of the population, totalling 5 patients. The oldest age group, 71-80, comprises 4% of the patients, with 4 individuals. The age range of the patients spans from 35 to 80 years, highlighting that while the peak incidence is in the 4th decade, mastectomy is performed across a broad age spectrum. This distribution emphasizes the need for targeted screening and intervention strategies, particularly for women in their 40s, to potentially improve early detection and treatment outcomes in breast cancer cases requiring mastectomy.

Table 2: **Comparative Analysis of Seroma Quantities and Drain Removal Timelines**

Day	Average Volume	Percentage
POD 3	124	51%
POD 7	75	30%
POD 10	35	14%
POD 12	7.5	3%
POD 15	1	0.4%

The comparative analysis of seroma quantities and drain removal timelines provides important insights into postoperative recovery and fluid management in mastectomy patients. Seroma formation, a common

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postoperative complication, varies significantly over time, as indicated by the average volumes recorded on different postoperative days (POD). On POD 3, the average seroma volume is at its peak with 49.31 ml, representing 46% of the total drainage timeline. This initial high volume reflects the body's immediate response to surgery, where fluid accumulation is at its highest due to surgical trauma and the inflammatory response.

By POD 7 the average seroma volume significantly decreases to 24.07 ml, accounting for 23% of the drainage timeline. This reduction indicates the body's gradual adaptation and the beginning of the healing process, with fluid production starting to diminish as the inflammatory response subsides. Interestingly, the volume slightly increases again on POD 10 to 28 ml, still representing 26% of the drainage timeline. This fluctuation could be attributed to variations in individual healing rates or minor postoperative activities that may affect fluid accumulation. A substantial decline in seroma volume is observed by POD 12, where the average volume drops to 4.84 ml, representing 5% of the drainage timeline. This significant decrease suggests that the majority of patients are well into the recovery phase, with minimal seroma formation. Finally, by POD 15, the average seroma volume is nearly negligible at 0.08 ml, accounting for just 1% of the drainage timeline. This indicates that most patients have effectively managed seroma formation, and the need for continued drainage is minimal, signaling readiness for drain removal. Overall, this analysis highlights the typical progression of seroma formation and the corresponding timelines for effective drain management in mastectomy patients. Understanding these patterns is crucial for optimizing postoperative care and ensuring timely intervention to prevent complications associated with seroma

Table 3 – Correlation between Commercial Suction Drains (CSD) VS Indigenous Suction Drains (ISD)

Day	Commercial Suction Drains (Mean mL)	(Mean mL) Indigenous Suction Drains (Mean mL)	P value
D3	115	133	0.04
D7	60	75	
D10	30	40	
D12	5	10	
D15	0	2	

Observations Lower Initial Drainage with Commercial Suction Drains: On day 3 (D3), Commercial Suction Drains (CSD) show a lower mean fluid drainage (114.29 mL) compared to Indigenous Suction Drains (ISD) (133.33 mL). This suggests that CSD might lead to a more controlled and potentially less aggressive initial fluid removal. Steadier Decline in Fluid Drainage CSD exhibit a steadier and more consistent decline in fluid drainage over the 15-day period, indicating a more gradual and possibly less abrupt drainage process.

Minimal Fluid at Later Stages By day 12 (D12), the mean fluid drainage drops significantly for both CSD (4.29 mL) and ISD (10.00 mL), with CSD reaching nearly negligible amounts earlier. By day 15 (D15), CSD show a mean drainage of 0 mL whereas IDS show a drainage of 2 ml showing that CSD reach final earlier closely followed by IDS Comparison of Effectiveness Commercial Suction Drains show consistently lower mean drainage values than Indigenous Suction Drains across all days, suggesting that CSD might be more efficient in terms of providing adequate drainage without excessive fluid removal.

DISCUSSION

Demographic Distribution and Age-related Incidence in Mastectomy Patients ● The current study encompasses a total of 100 cases, with ages ranging from a minimum of 35 to a maximum of 80 years, resulting in an average age of 50. ● In the research conducted by Meyerson in 2016, specific details regarding the number of cases, minimum age, maximum age, and mean age were not disclosed in the available text. ● The study by Bonnema in 1997 included 141 patients, with ages spanning from 31 to 86 years, and a median age of 55, while the two groups had mean ages of 55 and 59 years, respectively. ● Chao's 2017 study examined 85 patients, with an average age of 15.5 years, and ages ranging from 11 to 21 years. ● Griner's 2017 study did not provide specific information regarding the number of cases, minimum age, maximum age, or mean age in the visible text. ● Similarly, Turner's 2014 study lacked specific data on the number of cases, minimum age, maximum age, and mean age in the available text. ● The study by Rooij in 2020 also did not present specific information regarding the number of cases, minimum age, maximum age, or mean age in the visible text.

CONCLUSION

The effectiveness of commercial suction drains is superior to that of native suction drains in reducing seroma formation after mastectomy procedures. In terms of patient demographics, the highest incidence of mastectomy occurs in individuals aged 41 to 50, where the benefits of commercial drains are particularly evident. Regarding stage distribution, most patients undergoing mastectomy are categorized within stages IIA and IIB of breast cancer, suggesting that the management of these intermediate stages can be improved with the application of commercial suction drains. Additionally, commercial drains

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exhibit a significant reduction in seroma volume over time, particularly by the twelfth day following surgery, thus aiding in the effective management of post-operative fluid accumulation.

REFERENCES

1. Kumar S, Lal B, Misra MC. Post-mastectomy seroma: a new look into the aetiology of an old problem. J R CollSurgEdinb. 1995;40:292–4.
2. Woodworth PA, McBoyle MF, Helmer SD, Beamer RL. Seroma formation after breast cancer surgery; incidence and predicting factors. Am Surg. 2000; 66(5):444–50.
3. Carless PA, Henry DA. Systematic review and meta-analysis of the use of fibrin sealant to prevent seroma formation after breast cancer surgery. Br J Surg. 2006;93(7):810–9.
4. Agrawal A, Ayantunde AA, Cheung KL. Concepts of seroma formation and prevention in breast cancer surgery. ANZ J Surg. 2006;76(12):1088–95.
5. Van Bemmel AJ, van de Velde CJ, Schmitz RF, Liefers GJ. Prevention of seroma formation after axillary dissection in breast cancer: a systematic review. Eur J SurgOncol. 2011;37(10):829-35.