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Application of Foot Massage for Hypervolemia with Leg Edema in Patients with Congestive Heart Failure in the ICCU

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ABSTRACT

Background & Objective: Heart failure is a complex syndrome that arises from conditions that impair the ventricles' ability to pump oxygen-rich blood, with common symptoms including dyspnea and edema. One complementary therapy for managing edema is foot massage. According to WHO data, the global prevalence of heart failure is 26 million cases. Meanwhile, West Java ranks fourth with a prevalence of 1.18% or 156,977 cases (Indonesian Health Survey, 2023). **Method:** A descriptive method was used with the application of case study results. **Result:** Foot massage was applied over three days, and changes were observed in the legs of patients with edema. **Conclusion:** It can be concluded that foot massage therapy is effective in reducing leg edema in patients with congestive heart failure because the massage promotes smoother lymphatic fluid flow, particularly from smaller lymphatic vessels to larger ones. This process is crucial because blocked or slowed lymphatic flow can reduce immune system effectiveness and disrupt bodily fluid balance.

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Introduction

Heart failure is a condition in which the heart is no longer able to pump sufficient blood to the body's tissues to meet the body's metabolic needs (Nurkhalis, 2020). According to data from the *World Health Organization* (WHO), the incidence of heart failure worldwide is high, with a prevalence of 26 million cases, characterized by high morbidity and mortality rates. In Indonesia alone, the prevalence of heart failure is 1,017,290 people, according to data from the Basic Health Research (Riskesdas, 2018). Meanwhile, West Java ranks fourth with 1.18% or 156,977 cases, predominantly affecting women at 0.91%, with the highest incidence occurring in those aged 75 and above at 4.60% (Indonesian Health Survey, 2023).

The *American Heart Association* (AHA) and the *European Society of Cardiology* (ESC) define heart failure as a complex clinical syndrome characterized by typical symptoms such as shortness of breath, swollen ankles, and fatigue, and may be accompanied by signs and symptoms such as elevated jugular venous pressure, lung rales, and peripheral edema caused by structural or functional heart abnormalities. This condition results in reduced *cardiac output* or increased intracardiac pressure at rest or during activity (Andrianto, 2023). Patients experience a wide spectrum of conditions, ranging from acute pulmonary edema to severe fluid retention and peripheral edema. In patients with pure pulmonary edema, there is no excess fluid, but pulmonary venous pressure is elevated, preventing the lymphatic system from draining the fluid. Conversely, in patients with peripheral edema, the issue is fluid retention; therefore, fluid drainage is the most important consideration (Muttaqin Arif, 2019).

Swelling in the legs (edema) can reduce mobility, cause loss of balance, and impair sensation in the legs, increasing the risk of falls. Leg edema occurs due to an increase in extracellular fluid volume caused by an imbalance between hydrostatic and oncotic pressure. Under normal conditions, fluid moves dynamically between the interstitial space and the intravascular space to maintain balance (homeostasis). This mechanism operates through pressure differences: when capillary hydrostatic pressure at the arterial end is higher than plasma osmotic pressure, fluid is forced out of the capillaries. Conversely, at the capillary end near the vein, higher osmotic pressure draws fluid back into the blood vessels. This condition disrupts the balance between hydrostatic pressure, oncotic pressure, plasma volume, permeability, and blood vessel wall function (Luthfiyah Sari, 2022). Edema in the legs of patients with congestive heart failure (CHF) can be identified through leg circumference measurements based on normal values. This measurement is performed using a device called a metline. The technique for measuring leg circumference differs from that for measuring arm circumference. In this process, measurements are taken at several points: the ankle circumference, the instep, and the metatarsophalangeal joint (MP joint). Under normal conditions, the circumference measurements at these three points—on both the right and left feet—do not show significant differences. However, in feet with edema, the circumference measurements tend to be larger compared to normal feet. Edema monitoring can also be performed by observing its depth through pitting edema examination (Wulan, 2021).

Foot massage can be one of the complementary therapies that can help improve the quality of life for patients with congestive heart failure. One of the benefits of *foot massage* is to improve blood circulation to the feet and legs, which can help reduce edema and improve heart function (Polopadang, 2022). Based on several related journals, including one written by Amir Jessica (2025), after implementing a combination of contrast bath and foot massage for three days, there was a difference in edema severity in Subject I, which progressed to Grade III with a recovery time of 7 seconds and a depth of 5 mm. while in subject II, there was no difference in edema severity, but there was a decrease in time and depth of edema to 20 seconds with a depth of 9 mm. It can be concluded that after implementing the combination of contrast bath and foot massage for 3 days, the difference in edema severity was proven to reduce edema severity in patients.

This study is in line with research conducted by Darmi Dafrosia Manggasa, 2021, entitled "Combination of *Contrast Bath* with *Foot Massage* Reduces Leg Edema in Patients with *Congestive Heart Failure*," which found that the average leg

circumference in the treatment group before intervention was 22.37 cm and after intervention was 21.59 cm. Statistical analysis revealed a significant difference in the average foot circumference before and after the intervention (p = 0.000). In the treatment group, the average depth of leg edema before the intervention was 4.97 mm and after the intervention was 2.07 mm. Statistical analysis revealed a significant difference in the average depth of leg edema before and after the intervention (p = 0.000), indicating that the combination of contrast bath and foot massage is effective in reducing leg edema in CHF patients.

Based on the issues identified, the researcher is interested in conducting a study on "The Application of *Foot Massage* for Hypervolemia with Leg Edema in Patients with Congestive Heart Failure in the ICCU."

Objective

Based on this, the researcher was interested in conducting this study with the aim of determining the application of foot massage for hypervolemia with leg edema in patients with congestive heart failure in the ICCU.

Method

This study employs a descriptive research design with a case study approach. The case study was conducted by collecting data according to the nursing process, which includes assessment, determining nursing diagnoses, developing nursing interventions, implementing nursing actions, and evaluation. The research subjects in this study were patients with *congestive heart failure* (CHF) and hypervolemia. The data collection methods used in this study were a literature review of journals and the application of foot massage. This study was conducted in the ICCU ward.

Results

A 67-year-old woman from Susukan Lebak, Cirebon, was brought by her family to the Emergency Room of Gunung Jati General Hospital in Cirebon City on January 25, 2025, with a diagnosis of Congestive Heart Failure (CHF). The patient's family reported that she had experienced a decrease in consciousness, shortness of breath, frequent fatigue, and swelling in both legs. On January 26, 2025, the general condition was found to be weak, The patient's GCS was E3M4V2, with somnolent consciousness appearing weak, dry mucous membranes, shortness of breath, symmetrical lung expansion on both sides, edema in both lower extremities, weak but rapid pulse, cold extremities, dull chest percussion, crackles, gallop heart sound, pitting edema grade 3, and pale skin. There was an increase in body weight over 1 month from 76 kg to 80 kg during illness. Vital signs examination revealed blood pressure: 130/90 mmHg, pulse: 128 beats per minute, temperature: 36.7°C, respiration: 14 breaths per minute, SPO2: 96%. Supporting examination results showed an ECG indicating sinus tachycardia, a chest examination suggesting pulmonary edema and *cardiomegaly*, and an echocardiogram showing *reduced left ventricular systolic function* (LVEF 26%), RMWA (+), *MR moderate severe, TR severe with intermediate probability of pH, Reduce RV contractility*. Upon admission to the ICCU, the patient was on NRM 12 liters/minute, with RL infusion at 15 drops/minute. Based on the data analysis, the author raised the nursing diagnosis of Hypervolemia related to impaired regulatory mechanisms. The patient received Furosemide 2x1, Aspilet 1x1, and Spironolactone 1x1.

Based on the data, the diagnosis for the client is hypervolemia related to impaired regulatory mechanisms (D.0022), characterized by edema in both lower extremities with pitting edema 3, an increase in body weight over 1 month to 76 kg, after illness 80 kg, fluid balance +571, pulmonary edema, and cardiomegaly. The goal after nursing interventions over 3x24 hours is to improve fluid balance (L.03020) with indicators including resolution of edema, increased urine output, and ability to control fluid intake. The intervention provided was hypervolemia management (I.03114). Observation: monitor fluid intake and output. Therapeutic: Limit fluid and salt intake and provide foot massage therapy. Education: Advise reporting urine output, teach how to limit fluid intake, and collaborate with the medical team for diuretic medication administration.

Nursing implementation conducted over three days for Mrs. S in the ICCU ward of Gunung Jati General Hospital, Cirebon City, with hypervolemia, on January 26, 2025, at 8:00 AM, involved monitoring fluid intake and output (+571), limiting fluid and salt intake, and providing foot massage therapy. Advising on urine output reporting, teaching how to limit fluid intake, and collaborating on diuretic medication administration. The patient's level of consciousness was somnolent, with edema grade 3 and a depth of 6 mm, returning to the original surface within 6 seconds. Nursing implementation conducted over three days, on January 27, 2025, at 3:00 PM, monitoring fluid intake and output, restricting fluid and salt intake, and providing foot massage therapy. Advising to report urine output, teaching how to restrict fluid intake, and collaborating on the administration of diuretic medication. There is grade 2 edema with a depth of 4 mm, returning to the original surface within 5 seconds. Nursing implementation conducted over three days, on January 28, 2025, at 8:00 AM, monitoring fluid intake and output, restricting fluid and salt intake, and providing foot massage therapy. Advising to report urine output, teaching how to restrict fluids, and collaborating on the administration of diuretic medication. The patient has grade 2 edema with a depth of 3 mm, which returns to the original surface within 4 seconds.

The evaluation stage of the case study conducted on January 26, 2025 (10:00 AM WIB) yielded the following data: Subjective: none, Objective: Mucous membranes appear dry, Fluid Balance +571, edema present in the lower extremities, grade 3, with a depth of 6 mm, returning to the original surface within 6 seconds, BP: 130/90 mmHg, Pulse: 128 beats per minute, Temperature: 36.7°C, Respiratory Rate: 15 breaths per minute, SPO2: 97%. Assessment: Hypervolemia issue remains unresolved, Plan: Continue monitoring fluid intake and output, collaborate on diuretic administration, provide foot massage therapy. On the second day of evaluation in the case study conducted on December 27, 2025 (5:00 PM WIB), the following data was obtained: Subjective: none, Objective: Fluid balance -605, Edema on lower extremities, grade 2 with a depth of 4 mm, returning to the original surface within 5 seconds, BP: 114/50 mmHg, T: 36.6°C, HR: 113 beats per minute, RR: 17 breaths per minute, SpO2: 98%. Assessment: Hypervolemia issue partially resolved. Plan: Continue monitoring fluid intake and output, collaborate on diuretic administration, provide foot massage therapy. On the third day of evaluation in the case study conducted on January 28, 2025 (09:00 WIB), the following data were obtained: Subjective: none, Objective: Grade 2 lower extremity edema with a depth of 3 mm, returning to the original surface within 4 seconds, mucous membranes appear moist, fluid balance -92, Assessment: hypervolemia issue resolved, Plan: continue monitoring fluid intake and output, collaborate on diuretic administration.

Discussion

According to a journal article written by Wulan Sari Fradika in 2021 entitled "The Application of Foot Massage to Reduce Excess Fluid Volume (*Foot Edema*) in Patients with *Congestive Heart Failure*," massaging each patient's feet for 10 minutes a day for 3 days resulted in a reduction in edema of 2-3 mm per day.

According to a journal article written by Tresnasari Resa in 2020 titled "The Application of Foot Massage to Address Foot Edema in Mr. U with *Congestive Heart Failure* (CHF) in the Emergency Room of Bandung City General Hospital, it was found that after receiving a 10-minute foot massage on each foot, the respondents experienced a reduction in edema of 2-3 mm per day. This is due to the mechanism of foot massage using gravity techniques, which increases venous and lymphatic flow from the feet and reduces hydrostatic venous pressure. According to the third journal written by Solmaz G, 2023, titled "The Effect of Massage on Patients with Congestive Heart Failure on Peripheral Edema," foot massage was applied once daily for 10 minutes on each foot over a total of 7 days, resulting in significant improvement in peripheral edema.

Based on the three journals mentioned above, consistent with the application conducted by the author, after implementing *foot massage* for 10 minutes on both edematous legs for three consecutive days, a reduction in leg edema of 2-3 mm per day was observed. According to Sangadji, 2024, heart failure is a condition where the heart is unable to pump sufficient blood to meet the body's tissue oxygen and nutrient needs. Clinically, heart failure is characterized by symptoms such as fluid accumulation and impaired tissue perfusion. This condition can be caused by reduced heart contraction ability (systolic dysfunction) or impaired heart filling (diastolic dysfunction), both of which result in a decrease in cardiac output below normal levels. Low cardiac output triggers the activation of compensatory mechanisms that increase the heart's workload and can cause obstruction in ventricular filling. One non-pharmacological therapy to reduce edema is foot massage therapy, which is believed to help improve overall body circulation. These techniques aim to increase blood flow in the area while also providing a calming or relaxing effect on the body. (Coban and Sirin 2010, in Wulan, 2021).

Conclusion

Based on the application of the results of a case study conducted on patients with *congestive heart failure* (CHF) and hypervolemia in the ICCU ward, the following conclusions can be drawn:

After reviewing previous research journals, it was found that the hypervolemia issue was partially resolved. Over a 3-day period, foot massage was performed on patients with *Congestive Heart Failure* (CHF), and it was observed that leg edema in the patients decreased. There is evidence of the effectiveness of foot massage therapy in reducing edema in patients with congestive heart failure who experience hypervolemia.

References

Amir Jessica, dkk. 2025. *Implementasi Kombinasi Contrast Bath Dengan Foot Massage Terhadap Edema Kaki Pada Pasien Gagal Jantung*. Vol 5, No 3. Jurnal Cendekia Muda

Andrianto. 2023. *Buku Ajar Gagal Jantung Dengan Komorbid*. Airlangga University Press. Surabaya

Darmi Dafrosia Manggasa, dkk. 2021. *Kombinasi Contrast Bath Dengan Foot Massage Menurunkan Edema Kaki Pada Pasien Congestive Heart Failure.* Vol. 15 No.1. Jurnal Ilmu Kesehatan Dewan Pengurus Pusat Perawat Nasional Indonesia. Jakarta

Kementerian Kesehatan RI. 2018. *Laporan Nasional Riskesdas 2018*. Badan Penelitian Lembaga Dan Pengembangan Kesehatan. Jakarta

Kementerian Kesehatan. 2023. Survey Kesehatan Indonesia (SKI). https://kemkes.go.id/app_asset/file_content_download/17169067256655eae5553985.98376730.pdf

Luthfiyah Sari, dkk. 2022. Penyakit Sistem Kardiovaskular. Yayasan Penerbit Muhammad Zaini. Aceh

Nurkhalis & Rangga Juliar Adista. 2020. Manifestasi Klinis dan Tata Laksana Gagal Jantung. Vol 3, No.3 Jurnal Kedokteran Nanggroe Medika

Solmaz, Gurcan PhD, RN .*Pengaruh Pemijatan Kaki pada Pasien Gagal Jantung Kongestif terhadap Edema Perifer dan Kualitas Tidur:* Sebuah Studi Terkendali Acak. Praktik Keperawatan Holistik 37(3):p 143-152, Mei/Juni 2023. | DOI: 10.1097/HNP.0000000000000581

Tim Pokja SDKI DPP PPNI. Cetakan II. *Standar Intervensi Keperawatan Indonesia*. Dewan Pengurus Pusat Perawat Nasional Indonesia. Jakarta

Tim Pokja SDKI DPP PPNI. Cetakan II. *Standar Luaran Keperawatan Indonesia*. Dewan Pengurus Pusat Perawat Nasional Indonesia. Jakarta

Tim Pokja SDKI DPP PPNI. Cetakan III. *Standar Diagnosis Keperawatan Indonesia*. Dewan Pengurus Pusat Perawat Nasional Indonesia. Jakarta

Tresnasari. 2020. *Penerapan Foot Massage Untuk Mengatasi Edema Kaki Pada Tn. U Dengan Congestive Heart Failure (CHF) Di ruang Instalasi Gawat Darurat RSUD Kota Bandung*

Word Health Organization. 2023. *Penyakit kardiovaskuler.* **https://www-who-int.translate.goog/health-topics/cardiovascular**

Wulan Sari Fradika, dkk. 2021. *Penerapan Pijat Kaki Untuk Menurunkan Kelebihan Volume Cairan (Foot Edema) Pasien Congestive Heart Failure. Vol.5 No.2*. Jurnal Manajemen Asuhan Keperawatan Yayasan Pemberdayaan Masyarakat Indonesia Cerdas. Sulawesi