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Case Report

Oncology Section

Normal Saline-Furosemide Combination for Refractory Pedal Oedema in Palliative Care: A Case Report

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ABSTRACT

Pedal oedema is a distressing and disabling symptom commonly encountered in patients with advanced malignancy in the palliative care setting. It is frequently multifactorial in origin, arising from hypoalbuminaemia, venous stasis, impaired mobility, or direct tumour-related obstruction, and is often refractory to conventional diuretic regimens. We present the case of a 62-year-old male with primary pulmonary leiomyosarcoma metastatic to bone and liver who developed progressive pedal and scrotal oedema of six weeks' duration, causing significant impairment of mobility, sleep, and quality of life. The patient had previously received chemotherapy and radiotherapy, and further oncological treatment was not planned due to progressive disease and poor performance status. On assessment, he had bilateral grade 3 pitting oedema extending to the inguinal region, with thigh and calf circumferences increased by 4-5 cm from baseline. Investigations revealed stable renal function, mild hypoalbuminaemia, and no evidence of cardiac failure, deep venous thrombosis, or nephrotic syndrome. Conventional management with oral diuretics and fluid restriction produced minimal improvement. A trial of intravenous furosemide 20 mg administered with 100 mL normal saline over 30 minutes was initiated, aiming to overcome diuretic resistance. This resulted in increased urine output and partial reduction in oedema within 48 hours. The intervention was repeated weekly, leading to progressive improvement in swelling, mobility, and comfort over six weeks, without adverse events. Although complete resolution was not achieved, the patient experienced meaningful relief and regained functional independence for basic activities. This case highlights the potential role of normal saline–furosemide combination therapy as a pragmatic and well-tolerated approach for refractory oedema in advanced cancer within the palliative care context.

Keywords: Diuretics, Leiomyosarcoma, Neoplasm metastasis, Pulmonary neoplasms

CASE REPORT

A 62-year-old male with a known diagnosis of primary pulmonary leiomyosarcoma with metastases to the bone and liver was referred to the palliative care service for symptom control and supportive management. He had previously received six cycles of doxorubicin-based chemotherapy over an 18-month period, followed by palliative radiotherapy to vertebral and pelvic metastases for pain relief. Despite these interventions, the disease showed progressive systemic involvement.

Further oncological evaluation revealed advanced disease. Positron Emission Tomography-Computed Tomography (PET-CT) performed in September 2021 demonstrated a hypermetabolic retroperitoneal soft-tissue lesion with tumour thrombosis involving the right renal Inferior Vena Cava (IVC) and extension into the right atrium, along with metabolically active pulmonary nodules in both lungs. A liver biopsy performed in November 2020 had confirmed metastatic leiomyosarcoma, with immunohistochemistry positive for Smooth Muscle Actin (SMA), caldesmon, and p16 and negative for DOG1 and HMB45. The Ki-67 (MIB-1) proliferation index was approximately 50%. He had subsequently received combination chemotherapy with ifosfamide (Holoxan), doxorubicin (Adriamycin), and etoposide, with the final cycle administered in June 2021.

In view of progressive disease and declining functional status, no further disease-modifying oncological treatment was planned, and the patient was transitioned to best supportive care.

At presentation, the patient reported progressive bilateral pedal oedema of six weeks' duration, which had gradually extended to involve the thighs and scrotum. He also complained of worsening breathlessness for approximately three months and persistent bone pain for four months, despite ongoing analgesic therapy. The oedema caused significant discomfort, difficulty in wearing footwear, impaired ambulation, disturbed sleep, and challenges with personal hygiene, leading to a marked decline in quality of life.

On examination, the patient was conscious, cooperative, and oriented, with an Eastern Cooperative Oncology Group (ECOG) performance status of 3. Bilateral grade 3 pitting pedal oedema extended up to the inguinal region and was associated with marked scrotal oedema. The mid-calf circumference measured 41 cm on the right and 40.5 cm on the left (baseline one month earlier: 36 cm bilaterally), while the mid-thigh circumference measured 54 cm bilaterally. Cardiovascular examination revealed normal heart sounds with no raised jugular venous pressure. Respiratory examination findings were consistent with underlying lung malignancy, without features of acute cardiac failure. Abdominal examination revealed mild hepatomegaly without ascites.

Laboratory investigations demonstrated preserved renal function, with serum creatinine of 1.2 mg/dL (reference range: 0.7-1.3 mg/dL) and blood urea nitrogen of 29 mg/dL (reference range: 7-20 mg/dL). Serum albumin was mildly reduced at 2.8 g/dL (reference range: 3.5-5.0 g/dL). Serum electrolytes were within normal limits, including sodium 138 mmol/L (reference range: 135-145 mmol/L) and potassium 4.1 mmol/L (reference range: 3.5-5.0 mmol/L). Transthoracic echocardiography demonstrated preserved ventricular function without significant valvular abnormality. Venous Doppler ultrasonography of the lower limbs excluded deep venous thrombosis. There was no clinical or biochemical evidence of nephrotic syndrome, acute hepatic decompensation, or congestive cardiac failure.

Conventional management with oral furosemide 40 mg/day administered for two weeks, along with fluid restriction, resulted in minimal clinical improvement. Spironolactone 25 mg/day was added but was discontinued after five days due to gastrointestinal intolerance. Given the refractory nature of the oedema despite adequate duration of oral diuretic therapy and the associated

decline in quality of life, a trial of intravenous furosemide 20 mg administered with 100 mL of normal saline over 30 minutes was initiated, with the aim of improving renal perfusion and overcoming diuretic resistance.

Following the first administration, urine output increased to approximately 1.2 L within six hours, accompanied by subjective relief in lower-limb heaviness and scrotal discomfort. At 48 hours, objective measurements demonstrated a reduction in mid-calf circumference by 2 cm and mid-thigh circumference by 1 cm bilaterally, with improvement in oedema from grade 3 to grade 2. Although complete resolution was not achieved, the intervention was repeated on a weekly basis.

By the end of three weeks, the patient reported improved mobility, was able to ambulate indoors without assistance, and could wear footwear comfortably. At six weeks, further reduction in oedema was observed, although moderate residual swelling persisted (final mid-calf circumference: 37 cm on the right and 36.5 cm on the left; mid-thigh circumference: 50 cm bilaterally). Scrotal oedema regressed substantially, resulting in improved sitting comfort and ease of personal hygiene. Both the patient and caregivers expressed satisfaction with the symptomatic improvement, particularly with respect to mobility and overall comfort.

No adverse events, including hypotension, electrolyte imbalance, or deterioration in renal function, were observed during the six-week treatment period. The intervention was well tolerated, with consistent diuretic response and sustained, clinically meaningful symptomatic benefit.

DISCUSSION

Peripheral oedema is a frequent and clinically significant problem in patients with advanced cancer receiving palliative care. Its aetiology is typically multifactorial, reflecting the complex interplay of hypoalbuminaemia, venous or lymphatic obstruction, reduced mobility, renal hypoperfusion, neurohormonal activation, and direct tumour-related vascular compromise [1,2]. In palliative oncology, the impact of peripheral oedema extends well beyond fluid imbalance; it contributes substantially to pain, impaired mobility, sleep disturbance, difficulty with personal hygiene, loss of dignity, and increased caregiver burden. Consequently, contemporary palliative care frameworks emphasise symptom-directed management, proportionality of interventions, and alignment with patient-defined goals rather than correction of laboratory abnormalities or aggressive volume manipulation [2,3].

Standard management strategies for peripheral oedema in advanced illness include non-pharmacological measures such as limb elevation, skin care, and compression where tolerated, combined with pharmacological therapy- most commonly loop diuretics such as furosemide [1,3]. However, the effectiveness of oral diuretic therapy is frequently limited in advanced cancer due to diuretic resistance, impaired renal perfusion, altered pharmacokinetics, and intravascular volume depletion [4]. Aldosterone antagonists may be added in selected patients, but gastrointestinal intolerance, hyperkalaemia, and marginal benefit often limit their use in the palliative setting [3,5].

In the present case, conventional therapy consisted of oral furosemide 40 mg/day administered for two weeks, combined with fluid restriction, which produced minimal clinical or objective improvement. Spironolactone 25 mg/day was subsequently introduced but discontinued after five days due to gastrointestinal intolerance. Further escalation of oral diuretic therapy or sequential nephron blockade was not pursued because of poor response, intolerance, and the limited likelihood of meaningful benefit in the context of progressive metastatic disease. These decisions are consistent with palliative care principles, which prioritise minimising treatment burden and avoiding interventions that are unlikely to improve comfort or function [2,3].

Diuretic resistance is well documented in cardiology and nephrology and is increasingly recognised in palliative oncology [4,6]. Proposed mechanisms include reduced effective circulating volume, renal vasoconstriction, activation of the renin-angiotensin-aldosterone system, post-diuretic sodium retention, and impaired drug delivery to the nephron [4,6]. Mild hypoalbuminaemia, as observed in this patient, may further exacerbate intravascular depletion and reduce renal perfusion without necessarily precluding a diuretic response [7]. Importantly, this patient had preserved renal function, stable electrolytes, and no evidence of cardiac failure, nephrotic syndrome, or acute hepatic decompensation, making a carefully monitored therapeutic trial physiologically reasonable despite advanced malignancy.

The use of isotonic saline in combination with loop diuretics is paradoxical and not an established, evidence-backed regimen for routine management of peripheral oedema. Most available evidence originates from studies in refractory heart failure and cirrhosis, where hypertonic saline- rather than normal saline- has been combined with loop diuretics to enhance natriuresis and overcome diuretic resistance [8-10]. These studies suggest that restoring intravascular volume may improve renal perfusion and diuretic delivery, thereby augmenting urine output. However, such findings cannot be directly extrapolated to peripheral oedema in advanced cancer or to the use of isotonic saline, and high-quality evidence supporting this approach in palliative oncology is lacking.

Notably, a review of the recent literature (2022-2025) reveals no published case reports or clinical studies describing normal saline–furosemide combination therapy for refractory peripheral oedema in patients with pulmonary leiomyosarcoma or advanced solid tumours within a palliative care setting. Existing palliative care literature addressing oedema management focuses primarily on conventional diuretics, compression strategies, or symptomatic support, with limited exploration of alternative pharmacological approaches [1,3,11]. This absence of data underscores the novelty of the present case and highlights a gap between physiological rationale and evidence-based guidance in palliative oncology.

The relevance of this case to palliative care practice lies not in proposing a new standard of care, but in illustrating a pragmatic, individualised, and reversible intervention applied when conventional options had failed and symptom burden was severe. The saline-furosemide combination was used as a time-limited therapeutic trial, consistent with palliative care principles that support carefully monitored experimentation when potential benefits outweigh anticipated risks and align with patient goals [2,3].

The decision to administer the intervention on a weekly basis was guided by clinical response, durability of symptom relief, patient comfort, and caregiver feedback rather than by predefined dosing schedules. Weekly administration minimised hospital visits, reduced treatment burden, and allowed repeated reassessment of benefit versus harm. This flexible approach reflects real-world palliative practice, where rigid protocols are often inappropriate and dosing frequency is individualised according to patient priorities and tolerance [2].

Clinically, the intervention resulted in moderate but meaningful improvement. Reduction in limb circumference, regression of scrotal oedema, and improved mobility were observed over six weeks, with functional gains apparent within the first three weeks. Although complete resolution of peripheral oedema was not achieved, the degree of improvement was sufficient to restore indoor ambulation, allow footwear use, improve hygiene, and enhance comfort-outcomes that are highly valued in palliative care but often underrepresented in traditional biomedical endpoints [3,11]. Importantly, no adverse events such as hypotension, electrolyte imbalance, or renal dysfunction were observed, supporting the feasibility of this approach in carefully selected patients with preserved renal function.

This case also highlights the need for cautious interpretation and responsible reporting. Normal saline plus furosemide should not be viewed as an evidence-based therapy for refractory peripheral oedema, nor should it be routinely adopted outside highly selected contexts. Rather, it represents a physiologically informed, symptom-focused intervention that may be considered when conventional measures fail, provided that patient goals, risks, and monitoring capacity are carefully weighed.

CONCLUSION(S)

The combination of normal saline with intravenous furosemide provided partial but sustained relief of refractory pedal and scrotal oedema in a patient with advanced pulmonary leiomyosarcoma. Despite only moderate resolution, clinically meaningful gains in mobility, comfort, and sleep were achieved, which are central goals in palliative care. This case emphasises the importance of exploring pragmatic, cross-disciplinary approaches for symptom relief in advanced cancer. Further studies are required to define the role of saline-furosemide therapy in refractory oedema management within palliative medicine.

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