CASE REPORT

Use of closed controlled subcutaneous drainage to manage chronic lower limb oedema in patients with advanced cancer

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Chronic lower limb oedema is common in patients with advanced cancer and can be difficult to manage. In this paper, we present two patients who had severe cancer-related chronic lower limb oedema which was refractory to conventional therapy. It was satisfactorily managed using closed controlled subcutaneous drainage without any skin infections or complications. We also review the prevalence, diagnosis, and management of cancer-related chronic oedema and lymphoedema.

Introduction

Chronic lower limb oedema is common in patients with advanced cancer and has a significant impact on their physical, psychological, and functional states. Common causes of chronic lower limb oedema include deep vein thrombosis (DVT), hypoalbuminaemia, heart failure, medications, lymphoedema, and pelvic disease causing reduced venous outflow. Among these, chronic venous obstruction caused by DVT and lymphoedema are the two most difficult to manage. We present two patients who had severe cancer-related chronic lower limb oedema which was refractory to conventional therapy but was satisfactorily managed using closed controlled subcutaneous drainage. This is the first report of the use of this technique in Hong Kong.

Case reports

Case 1

An 80-year-old man presented in June 2006 with a 3-month history of progressive lower limb oedema. He also had mild anaemia. Investigations, including a colonoscopy and an abdominal computed tomographic scan, confirmed carcinoma of the sigmoid colon with multiple intra-abdominal and pelvic lymphadenopathies causing bilateral common iliac, left internal iliac, and left femoral vein thromboses. He declined any form of surgical or oncological treatment. The aetiology of his progressive oedema was believed to be malignancy-related chronic DVT resulting in chronic venous insufficiency. He was put on low-molecular-weight heparin, followed by oral anticoagulants but this had to be stopped because of ongoing gastro-intestinal blood loss. From November 2006, he was repeatedly admitted to medical wards for management of his worsening lower limb oedema. His serum albumin was 23 g/L. Despite optimal diuretic therapy and intensive in-patient lymphatic massage, the oedema got worse on the left side and became non-pitting. Morphine was prescribed to help him cope with the distension pain in his legs but this gave partial relief only. Over time his mobility deteriorated from independent walking to being chairbound. Closed controlled subcutaneous drainage was used to drain 1055 mL fluid from the left leg over 5 days, achieving a marked reduction in swelling. The fluid protein was low (3 g/L). The left thigh girth (10 cm above the superior pole of the patella) fell from 41 to 37 cm and his left calf girth (10 cm below the inferior pole of the patella) fell from 31 to 27.5 cm after treatment (Table). The patient resumed ambulation and was successfully discharged home. He suffered neither skin infection nor a recurrence of the oedema. He died 2 months later.

Case 2

A 72-year-old man presented to a urologist in August 2005 with haematuria. A rectal examination revealed a rectal mass. Investigations including a cystoscopy, computed tomographic scan, and positron emission tomography scan confirmed carcinoma of the rectum with local bladder invasion and multiple liver, intra-abdominal and pelvic lymph node metastases. A palliative loop transverse colostomy was then performed, followed

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使用閉控皮下引流法治療晚期癌症病人的慢性下肢腫脹

晚期癌症病人的慢性下肢腫脹很普遍，但很難治理。本文報告兩名患有與癌症有關的慢性下肢腫脹的病人，他們對傳統療法無效。使用閉控皮下引流法控制病情，沒有出現任何皮膚感染及併發症，效果令人滿意。本文亦回顧與癌症有關的慢性下肢腫脹的現患率、診斷，以及治療方法。

FIG. Closed controlled subcutaneous drainage of patient 2's right lower limb

by palliative radiotherapy to the lower abdomen and pelvis. In June 2006, he developed progressive oedema in both lower limbs and genitals, requiring multiple hospital admissions. Successive doppler ultrasound lower limb scans failed to find any DVT. His serum albumin was 25 g/L. The chronic oedema was believed to be lymphoedema secondary to the surgery, radiotherapy, and malignant infiltration of the pelvic lymphatics. Physical therapy, including manual massaging, intermittent pneumatic pumping, and compression bandaging achieved some improvement initially but eventually the lymphoedema got worse. There was seepage of fluid from the skin and he also developed penile oedema, making it difficult to pass urine. Foley catheter insertion failed and he felt a loss of dignity when using diapers. Diuretic therapy and oral slow-release morphine were prescribed with unsatisfactory effects. In December 2006, subcutaneous drainage (Fig) was used to drain 820 mL fluid from the right leg over 7 days, followed by compression bandaging. The fluid protein level was low (5 g/L). The thigh and calf girths dropped from 54 and 44.5 cm to 52 and 43.5 cm respectively (Table). The genital oedema improved, allowing urine to be passed normally, and the lymphorrhoea subsided. There was no skin infection. There was gradual recurrence of the lymphoedema over the ensuing weeks but the lymphorrhoea did not recur. He died comfortably 1 month later.

Discussion

Chronic oedema is common in patients with advanced cancer but is often poorly managed. A recent systematic review of symptom prevalence in patients with incurable cancer found that the pooled prevalence for chronic oedema was 19%, and that it dropped to 8% in their last 1 to 2 weeks of life.[1]

Treatment should be directed to the underlying aetiologies as far as possible. Deep vein thromboses are commonly seen in patients with advanced cancer as they are in a prothrombotic state, although the condition remains underdiagnosed in these patients. Anticoagulants must be used cautiously in these patients due to both the effects of the cancer itself and its treatments.[2,3] In a case series,[4] long-term low-molecular-weight heparin appeared to be more effective than warfarin in this population. If left untreated, DVT often leads to the post-thrombotic

TABLE. Left lower limb drainage output and limb girth of patient 1, and the right lower limb drainage output and limb girth of patient 2

	Day						
	1	2	3	4	5	6	7
Patient 1 (left lower limb)							
Thigh output (mL)	120	100	70	0	20	0	0
Calf output (mL)	420	150	50	60	25	0	0
Thigh girth (cm)	41	39	38.5	37	37	37	37
Calf girth (cm)	31	28.5	28.5	28	28.5	28	27.5
Patient 2 (right lower limb)							
Thigh output (mL)	0	250	120	100	110	100	120
Calf output (mL)	0	20	0	Off drain	Off drain	Off drain	Off drain
Thigh girth (cm)	54	53.5	53	52.5	52.5	52	52
Calf girth (cm)	44.5	44	43.5	43	43	43.5	43.5

syndrome and chronic venous insufficiency, which can progress to a combined venous/lymphatic disorder.

In palliative care settings, the causes of lymphoedema are usually lymph node metastases, pressure from malignant tumours, radiotherapy, and chronic venous insufficiency. Its prevalence ranges from 12 to 60% for patients with breast cancer[5-7] and 28 to 47% for patients with gynaecological cancer.[8,9]

The diagnosis of lymphoedema is largely clinical. The Stemmer sign, positive when the skin fold at the base of the second toe cannot be raised, is indicative of lymphoedema. Typically, the lymphatic fluid that accumulates secondary to lymphoedema has a high protein but this was not the case for our second patient. Possible causes include a rise in his capillary filtration rate or interstitial proteolysis.[10] It has been reported that lymph protein levels are not uniform and depend on regional differences in capillary permeability modified by changes in capillary filtration pressure.[11]

Treatment of lymphoedema aims for control rather than a cure. The treatment modalities include pharmacological treatment, physical therapies, and surgical procedures. Diuretics can help to encourage the excretion of salt and water and hence reduce capillary filtration and lymph formation. There is no evidence, however, that this encourages lymph drainage, so while diuretic therapy may be helpful in chronic oedema of a mixed aetiology, it is not recommended for treating lymphoedema. Benzopyrones (flavonoids, coumarin) are thought to work by increasing the number of macrophages, thus enhancing proteolysis and the removal of protein and thereby oedema.[12] Badger et al[13] reviewed 15 trials, however, and concluded that there was not yet enough evidence to show whether benzopyrones are either beneficial or unhelpful for reducing lymphoedema.

There is also not enough evidence[14] to draw conclusions about which physical therapy is most useful for limb lymphoedema. For arm lymphoedema secondary to breast cancer therapy, Moseley et al[15] concluded that the more intensive and health professional–based therapies such as manual lymphatic drainage and pneumatic pumping generally yielded greater volume reductions than self-instigated therapies such as compression garment wearing, exercise, and limb elevation. In a few conditions, surgical operations such as excisional procedures, drainage procedures such as lymphovenous microvascular anastomosis or liposuction[16,17] may be helpful. Our second patient received optimal doses of diuretic therapy as well as intensive physical therapies with unsatisfactory results. His general condition was too poor for surgery.

The use of subcutaneous controlled drainage to reduce lower limb oedema was first reported by Clein and Pugachev in 2004.[18] In their series, all patients had advanced cancer and were suffering from refractory chronic oedema or lymphoedema. He placed subcutaneous needles in the swollen legs, using three on each side, at the dorsum of the foot, the ankle, and the lower thigh. Fluid volumes ranging from 1 to 8 L were drained from seven of his eight patients. No infection occurred in his series and sterile techniques were fully employed during needle insertion. We modified the technique and used two subcutaneous angiocatheters (20-22 G), which were placed in the lateral aspects of the lower thigh and ankle. Modification was made to reduce the risk of bleeding, risk of infection, and pain of insertion. A strict sterile technique was used. A drainage period of less than 7 days was also chosen to lessen the risk of infection and the injection site was monitored daily for signs of infection. Over the week, the drainage volume was larger in the calf drain for the first patient, but it was larger in the thigh drain for the second patient. The sterile drainage bags lay on the side of the bed for gravity drainage. We postulate that when the interstitial fluid volume is large, the pressure is adequate for effective gravity drainage. Indeed, both patients achieved an objective reduction in their thigh and calf girths and their symptoms were satisfactorily controlled.

There are several questions about this technique that need further clarification. These are: whether ultrasound-guided insertion of the angiocatheter into the subcutaneous space can facilitate better drainage; whether this technique can be of use in non–cancer-related chronic oedema; whether this technique is applicable to chronic upper limb oedema; and last but not least, how long do the beneficial effects last. If patients survive longer, another procedure may be needed to further relieve their symptoms.

There are no evidence-based guidelines for the treatment of chronic oedema or lymphoedema, although a consensus document on best practices for managing lymphoedema has been reported.[19] Hence, more randomised studies are needed if an evidence-based approach is to be adopted. Meanwhile, for patients with advanced cancer and refractory chronic oedema not responsive to conventional therapy, subcutaneous drainage can be considered a useful option for the relief of distressing symptoms caused by the oedema.

References

1. Teunissen SC, Wesker W, Kruitwagen C, de Haes HC, Voest EE, de Graeff A. Symptom prevalence in patients with incurable cancer: a systematic review. J Pain Symptom Manage 2007;34:94-104.
2. Falanga A, Zacharski L. Deep vein thrombosis in cancer: the scale of the problem and approaches to management. Ann Oncol 2005;16:696-701.
3. Noble S. The challenges of managing cancer related venous thromboembolism in the palliative care setting. Postgrad Med J 2007;83:671-4.
4. Noble SI, Hood K, Finlay IG. The use of long-term low-molecular weight heparin for the treatment of venous thromboembolism in palliative care patients with advanced cancer: a case series of sixty two patients. Palliat Med 2007;21:473-6.
5. Paskett ED, Naughton MJ, McCoy TP, Case LD, Abbott JM. The epidemiology of arm and hand swelling in premenopausal breast cancer survivors. Cancer Epidemiol Biomarkers Prev 2007;16:775-82.
6. Meric F, Buchholz TA, Mirza NQ, et al. Long-term complications associated with breast-conservation surgery and radiotherapy. Ann Surg Oncol 2002;9:543-9.
7. Ozaslan C, Kuru B. Lymphedema after treatment of breast cancer. Am J Surg 2004;187:69-72.
8. Hong JH, Tsai CS, Lai CH, et al. Postoperative low-pelvic irradiation for stage I-IIA cervical cancer patients with risk factors other than pelvic lymph node metastases. Int J Radiat Oncol Biol Phys 2002;53:1284-90.
9. Ryan M, Stainton MC, Slaytor EK, Jaconelli C, Watts S, Mackenzie P. Aetiology and prevalence of lower limb lymphoedema following treatment for gynecological cancer Aust NZ J Obstet Gynaecol 2003;43:148-51.
10. Stanton AW, Levick JR, Mortimer PS. Chronic arm edema following breast cancer treatment. Kidney Int Suppl 1997;59: S76-81.
11. Witte CL, Witte MH, Dumont AE, Cole WR, Smith JR. Protein content in lymph and edema fluid in congestive heart failure. Circulation 1969;40:623-30.
12. Casley-Smith JR. The pathophysiology of lymphoedema and the action of benzo-pyrones in reducing it. Lymphology 1988;21:190-4.
13. Badger C, Preston N, Seers K, Mortimer P. Benzo-pyrones for reducing and controlling lymphoedema of the limbs. Cochrane Database Syst Rev 2004;(2):CD003140.
14. Badger C, Preston N, Seers K, Mortimer P. Physical therapies for reducing and controlling lymphoedema of the limbs. Cochrane Database Syst Rev 2004;(4):CD003141.
15. Moseley AL, Carati CJ, Piller NB. A systematic review of common conservative therapies for arm lymphoedema secondary to breast cancer treatment. Ann Oncol 2007;18:639-46.
16. Brorson H, Aberg M, Svensson H. Complete reduction of arm lymphoedema by liposuction following breast cancer – 5 year results. Lymphology 1999;33(Suppl):250S-253S.
17. Gloviczki P. Principles of surgical treatment of chronic lymphoedema. Int Angiol 1999;18:42-6.
18. Clein LJ, Pugachev E. Reduction of edema of lower extremities by subcutaneous, controlled drainage: eight cases. Am J Hosp Palliat Care 2004;21:228-32.
19. Lymphoedema framework. Best practice for the management of lymphoedema. International Consensus. London: MEP Ltd; 2006.