

# Importance of identifying extrinsic vein compression in advanced cancer patients with lower extremity edema: based on the computed tomography venography results

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## Introduction

Computed tomography(CT) venography is an useful examination to define the causes of lower extremity edema in cancer patients, as it provides extensive anatomical information on reversible causes of edema, such as deep vein thrombosis(DVT) and extrinsic vein compression(EVC). D-dimer is commonly used for the differential diagnosis of DVT in cancer patients with lower extremity edema, but its titer is commonly elevated in advanced cancer due to various causes, which makes it less efficient clinically.

## Aim

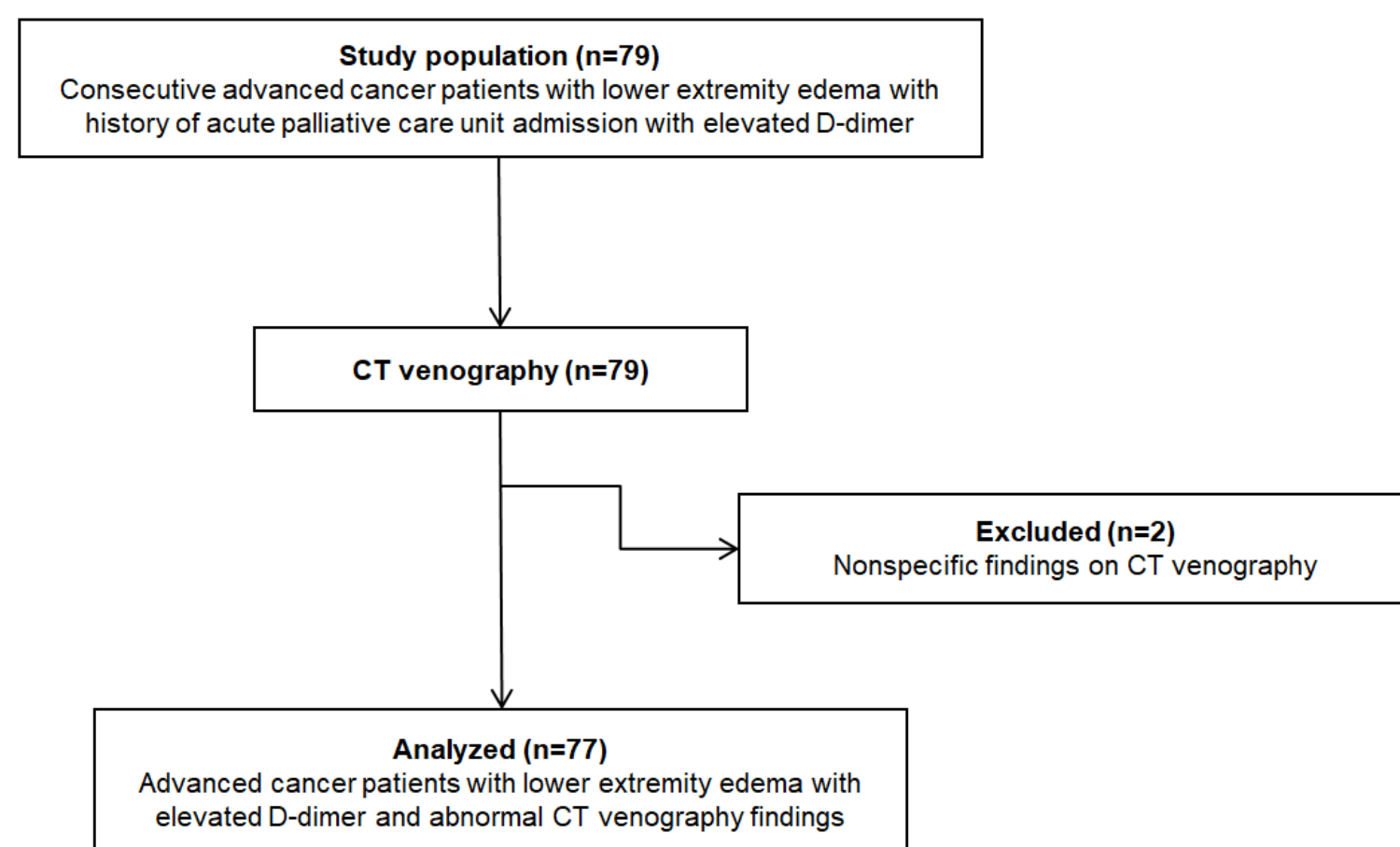
The purpose of the study is to evaluate the clinical course of advanced cancer patients with lower extremity edema and elevated D-dimer who underwent CT venography.

## Methods

We conducted a retrospective review of the medical charts of 77 advanced cancer patients with lower extremity edema and elevated D-dimer who underwent CT venography.

We checked the readings of CT venography confirmed by a radiology specialist, laboratory findings, history of anticoagulant administration or stent insertion, expire date etc.

**Figure 1. Flow of enrollment and diagnosis of study population**



## Results

As CT venography results, 33 patients (42.6%) were diagnosed DVT, and 22 (28.6%) were diagnosed EVC and soft tissue edema(STE) respectively. The mean D-dimer titer was the highest in the DVT group but there was no significant difference among groups (DVT group mean 9.01 ug/mL, EVC group mean 5.11 ug/mL, STE group mean 5.2 ug/mL). Anticoagulants were administered in 60.6%(n=20) of DVT patients, and conservative treatment was implemented due to bleeding tendency(n=7), short life expectancy(n=2) etc. In EVC group, 22.7%(n=5) of patients had stent insertion, and 36.4%(n=8) of patients had anticoagulants administered, considering their general health condition.

**Table 1. Demographic characteristics of the study population**

Characteristics	N (%)	
Age*, years	30-39	5 (6.3)
	40-49	5 (6.3)
	50-59	28 (35.4)
	60-69	26 (32.9)
	70-79	11 (13.9)
80-89	4 (5.1)	
Sex, n(%)	Men	26 (32.9)
	Women	53 (67.1)
Main primary cancer, n(%)	Ovary (C56)	11 (13.9)
	Lung (C33-34)	11 (13.9)
	Colorectal (C18-21)	10 (12.7)
	Uterine (C53-55)	9 (11.4)
	Pancreas (C25)	7 (8.9)
	Breast (C50)	5 (6.3)
	Liver (C22)	4 (5.1)
	Stomach (C16)	4 (5.1)
	Male reproductive system (C60-63)	3 (3.8)
	Urinary tract (C64-68)	3 (3.8)
	Vulva/Vagina (C51-52)	2 (2.5)
Other	10 (12.7)	
Laboratory abnormality	Creatinine elevation	5 (6.3)
	TFT abnormality	25 (31.7)
	BNP elevation	42 (53.2)
	Hypoalbuminemia	49 (62.0)
	Hyperbilirubinemia	12 (15.2)

**Table 2. Clinical characteristics of the study population according to CT venogram results**

Characteristics N(%) or mean ± SD (range)	CT venogram result			P-value	
	DVT (N=33)	EVC (N=22)	STE (N=22)		
Age*, years	62.8 ± 13.4 (30-85)	55.0 ± 9.6 (30-76)	61.2 ± 11.0 (32-85)	0.051	
Sex	Men	9 (27.3)	5 (22.7)	11 (50.0)	0.108
	Women	24 (72.7)	17 (77.3)	11 (50.0)	
Main primary cancer	Lung (7, 21.2) Pancreas (5, 15.2) Colorectal (4, 12.1) Ovary (4, 12.1)	Ovary (5, 22.7) Uterine (4, 18.2) Colorectal (3, 13.6) Lung (2, 9.1)	Colorectal (3, 13.6) Stomach (3, 13.6) Liver (2, 9.1) Vulva/Vagina (2, 9.1) Uterine (2, 9.1)	-	
Laboratory findings	D-dimer (ug/mL)	9.01 ± 7.53 (0.62-20)	5.11 ± 4.84 (0.33-20)	5.2 ± 4.62 (0.30-20)	0.153
	Creatinine (mg/dL)	0.72 ± 0.39 (0.14-1.72)	0.62 ± 0.34 (0.14-1.51)	0.57 ± 0.33 (0.14-1.72)	0.279
	TSH (uIU/mL)	5.57 ± 9.24 (0.03-52.49)	4.28 ± 3.98 (0.03-16.63)	3.61 ± 3.54 (0.23-17.95)	0.822
	free T4 (ng/dL)	1.19 ± 0.35 (0.523-1.79)	1.20 ± 0.30 (0.71-1.65)	1.24 ± 0.30 (0.58-1.870)	0.856
	BNP (pg/mL)	672.74 ± 839.01 (30.80-2704.00)	558.20 ± 1353.17 (37.56-6489.00)	311.40 ± 310.25 (33.41-1220.00)	0.736
	Albumin (g/dL)	3.15 ± 0.54 (2.0-4.5)	3.14 ± 0.50 (2.0-4.1)	3.10 ± 0.39 (2.4-3.9)	0.935
	Total bilirubin (mg/dL)	1.19 ± 2.39 (0.15-13.56)	1.07 ± 2.80 (0.19-13.56)	1.26 ± 1.95 (0.19-8.80)	0.517

**Table 3. Compression sites and causes of extrinsic vein compression**

Characteristics	N(%)	
Compressed vein	unilateral CIV only	5 (22.7)
	IVC only	4 (18.2)
	unilateral CIV + IVC	5 (22.7)
	unilateral CIV + unilateral EIV	4 (18.2)
	bilateral EIV	2 (9.1)
	bilateral CIV + IVC	1 (4.5)
Cause	bilateral CIV + unilateral EIV	1 (4.5)
	Primary cancer mass	5 (22.7)
	Metastatic cancer mass	5 (22.7)
	Metastatic lymphadenopathy	10 (45.5)
	Malignant ascites	2 (9.1)

**Table 3. Independent prognostic indices of survival**

	DVT		EVC		STE	
	N	Days, mean ± SD (range)	N	Days, mean ± SD (range)	N	Days, mean ± SD (range)
Stent	2	128 ± 35.3 (103-153)	5	275.8 ± 332.8 (54-832)	0	
Anticoagulant	20	246.8 ± 227.6 (30-771)	8	190.5 ± 266.7 (33-771)	1	408
Conservative treatment	11	36.1 ± 36.9 (0-103)	9	68 ± 66.0 (6-206)	21	196.4 ± 296.0 (5-1152)
Total	33	172.2 ± 207.3 (0-771)	22	159.8 ± 231.6 (6-832)	22	206.0 ± 292.3 (5-1152)

## Conclusion

Through CT venography, EVC was diagnosed in 28.6% of advanced cancer patients with lower extremity edema and elevated D-dimer. Our data suggest that diagnosis of reversible causes of lower extremity edema might increase patients' quality of life through appropriate interventional treatment even in a hospice - palliative care setting.