



Factors influencing chemoport-associated thrombosis: a retrospective single-center study

Up Huh¹, Gwon-Min Kim²

¹ Department of Thoracic and Cardiovascular Surgery, Pusan National University School of Medicine, Biomedical Research Institute, Pusan National University Hospital, Busan, Republic of Korea. ² Medical Research Institute, Pusan National University, Busan, Republic of Korea.

Author: Up Huh, MD, PhD, Assistant Professor, Surgeon, Department of Thoracic and Cardiovascular Surgery, Pusan National University School of Medicine, 179 Gudeok-Ro, Seo-Gu, Busan 49241, South Korea. tymfoo82@gmail.com, +82-10-90184983



Background and objective

Chemoport-related thrombosis (CRT) is a serious complication that causes disease and disrupts the administration of intravenous cancer treatment. The purpose of this study is to find factors associated with the occurrence CRT.

Methods

This single-center retrospective study included 1690 cases of chemoport implantation between January 2017 and December 2020.

Results

Overall, chemoports were inserted in 1582 patients. The average duration of chemoport use was 481 days (range 1–1794, median 309). Among 1690 cases, CRT occurred in 24 cases (1.42%). There was a statistically significantly higher incidence of CRT in the lung cancer group compared to the non-lung cancer group (2.3% vs. 1.0%; $p<0.036$). Occlusion occurred statistically significantly more frequently in the CRT group than in the non- CRT group (12.5% vs 2.8%; $p<0.030$). Pulmonary embolism occurred statistically significantly more frequently in the CAT group than in the non- CRT group (8.3% vs 1.2%; $p<0.002$). The catheter tip was placed statistically significantly shorter in the CRT group than in the non-CAT group (Distance from carina to tip of catheter, $21.21\pm11.55\text{mm}$ vs $28.62\pm17.39\text{mm}$; $p<0.038$) (Number of bodies of the thoracic spine from the carina to the end of the catheter, 2.71 ± 0.69 vs 3.14 ± 0.97 ; $p<0.031$).

Table 1. Patient characteristics

		Overall (n=1690)	CRT (n=24)	Non-CRT (n=1666)	p
Age		63.38±11.58	64.00±11.07	63.37±11.59	0.792
Male		956 (56.6)	16 (66.7)	940 (56.4)	0.315
Malignancy	Solid	1404 (83.1)	18 (75.0)	1386 (83.2)	0.288
	Hematologic	286 (16.9)	6 (25.0)	280 (16.8)	
Lung cancer	Yes	575 (34.0)	13 (54.2)	562 (33.7)	0.036
	No	1115 (66.0)	11 (45.8)	1104 (66.3)	
Insertion direction ¹	Left	162 (9.6)	3 (12.5)	159 (9.5)	0.625
	Right	1528 (90.4)	21 (87.5)	1507 (90.5)	
Brand	Celsite	306 (18.1)	4 (16.7)	302 (18.1)	0.854
	Smiths Medical	1384 (81.9)	20 (83.3)	1364 (81.9)	
Infection		80 (4.7)	1 (4.2)	79 (4.7)	0.895
Occlusion		49 (2.9)	3 (12.5)	46 (2.8)	0.005
PTE		22 (1.3)	2 (8.3)	20 (1.2)	0.002
HTN		634 (37.5)	7 (29.2)	627 (37.6)	0.395
DM		429 (25.4)	6 (25.0)	423 (25.4)	0.965
CAOD		110 (6.5)	1 (4.2)	109 (6.5)	0.639
PAOD		8 (0.5)	0 (0.0)	8 (0.5)	0.734
CVA		97 (5.7)	0 (0.0)	97 (5.8)	0.223
COPD		110 (6.5)	0 (0.0)	110 (6.6)	0.193
Renal insufficiency		103 (6.1)	4 (16.7)	99 (5.9)	0.029
Medication	No	1452 (85.9)	22 (91.7)	1430 (85.8)	0.605
	Antiplatelet	175 (10.4)	1 (4.2)	174 (10.4)	
	Anticoagulation	63 (3.7)	1 (4.2)	62 (3.7)	

CRT, chemoport-related thrombosis; PTE, pulmonary thromboembolism; HTN, hypertension; DM, diabetes mellitus; CAOD, coronary arterial occlusive disease; PAOD, peripheral arterial occlusive disease; CVA, cerebrovascular accident; COPD: chronic obstructive pulmonary disease.

¹All chemoport insertions used the internal jugular vein.

Table 2. The factors associated with chemoport insertion

Variables	Overall (n=1690)	CRT (n=24)	Non-CRT (n=1666)	p
Period of use	454.28±384.58	257.67±276.37	457.12±385.25	0.002
Location of catheter tip ¹ (mm)	28.52±17.35	21.21±11.55	28.62±17.39	0.038
Location of catheter tip ²	3.13±0.97	2.71±0.69	3.14±0.97	0.031
Angle of the catheter ³	52.50±12.45°	55.08±12.37°	52.46±12.45°	0.306
Size of catheter (Fr)	6.10±0.27	6.08±0.19	6.10±0.27	0.714

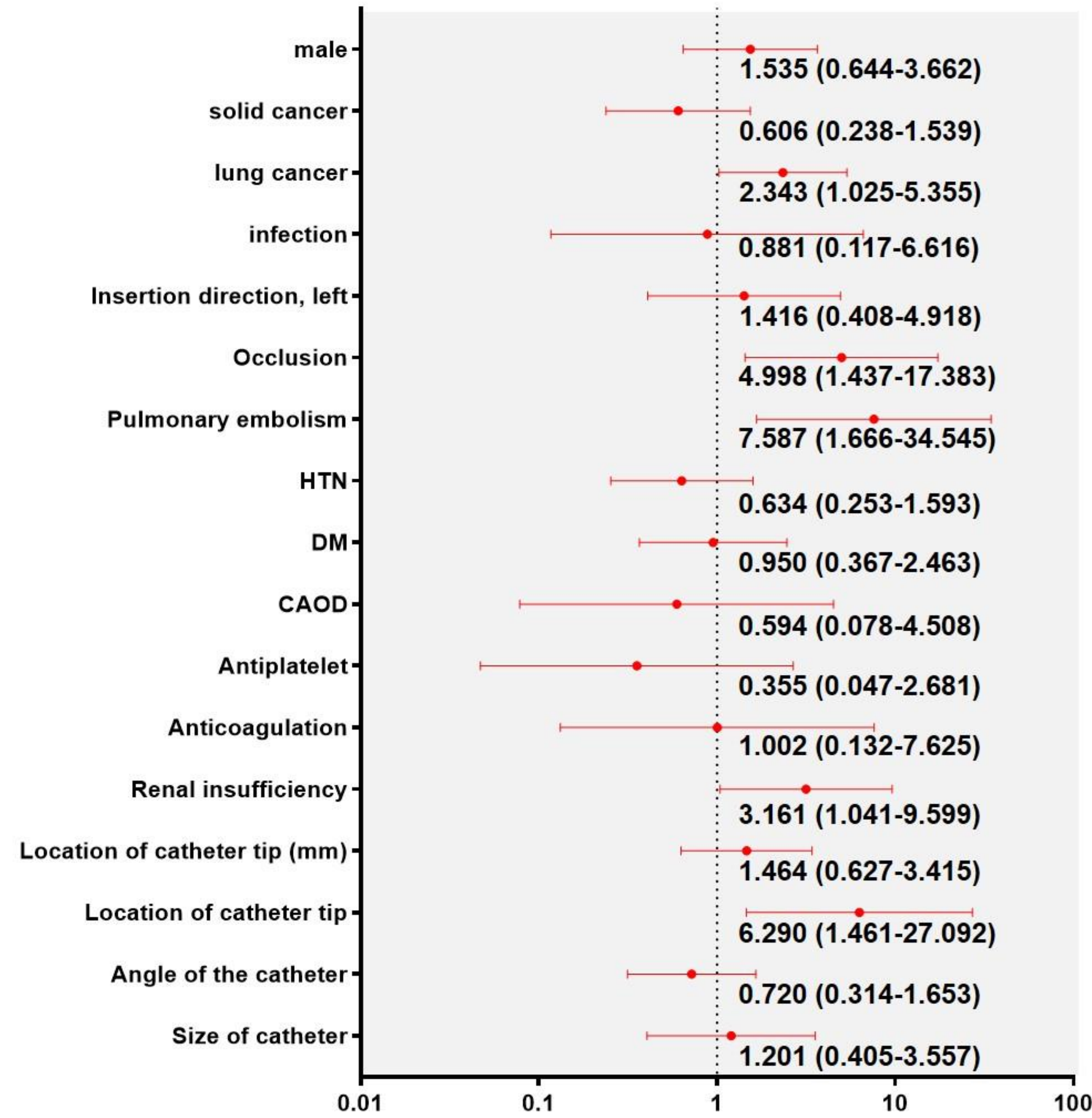
CRT, chemoport-related thrombosis

¹Distance from carina to tip of catheter; ²Number of bodies of the thoracic spine from the carina to the end of the catheter; ³The angle formed by the port, the apex of the catheter, and the catheter tip. This is graphically depicted in Figure 1.

Table 3. Cancer characteristics

Site of the primary cancer	N = 1690 (%)	
Solid		
	Bladder or urinary tract	55 (3.3)
	Bone	6 (0.4)
	Brain	6 (0.4)
	Breast	196 (11.6)
	Soft tissue	18 (1.1)
	Colorectal	168 (9.9)
	Cancer of unknown primary site	19 (1.1)
	Gastric	87 (5.1)
	Kidney	13 (0.8)
	Liver or biliary tract	51 (3.0)
	Lung	575 (34.0)
	Others	17 (1.0)
	Ovarian or peritoneal	20 (1.2)
	Pancreas	79 (4.7)
	Prostate	6 (0.4)
	Skin	5 (0.3)
	Small intestine	2 (0.1)
	Testis	1 (0.1)
	Thymus	7 (0.4)
	Thyroid	4 (0.2)
	Upper aerodigestive tract	47 (2.8)
	Uterus	12 (0.7)
Hematologic		
	Leukemia	9 (0.5)
	Lymphoma	254 (15.0)
	Multiple myeloma	26 (1.5)
	Myelodysplasia	7

Fig1. Cox proportional hazards regression analysis for the cause of infection



Discussion and Conclusion

A short catheter tip location may cause more CAT. Therefore, placing the catheter tip in an appropriate location is thought to be helpful in preventing CAT. The higher incidence of CAT in the lung cancer group may indicate that lung cancer affects the superior vena cava or right atrium.