Role of ECMO for Fatal Pheochromocytoma

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Case Summary A 38-year old man with no medical history visited for ongoing chest pain started 1 hour ago. EKG showed ST depression in diffuse leads with minimal ST elevation in anterolateral leads. To rule out aortic dissection due to the patient's symptom of suddenly started extreme chest pain radiating to backside, 3 dimensional aorta CT was performed during activating coronary angiographic team. Except left adrenal gland mass, there was no remarkable finding. Right after imaging evaluation, his vital sign deteriorated combined respiratory failure. Mechanical ventilator and inotropes were applied. However, blood pressure fluctuated from 220 to 44mmHg despite continuous up and down titration of inotropes. By reviewing again of aorta CT, the mass at adrenal gland was suspected of adenoma with internal hemorrhage or pheochromocytoma. Thereafter, cardiac arrest occurred, and transthoracic echocardiography showed very severe global hypokinesia with 22% of ejection fraction. Although ECMO, massive volume replacement, oral alpha blocker, and multiple inotropes were applied, systemic hypoperfusion and metabolic acidosis continuously aggravated. After consultation with surgery department, emergent laparoscopic adrenalectomy was performed. Pathological diagnosis confirmed pheochromocytoma. After operation, probably due to the disappearance of catecholamine surge, vital sign deteriorated again. Multiple vasopressors, massive volume replacement, and continuous renal replacement therapy were applied which was successful to restore the vital sign and systemic hypoperfusion. Thanks to the improvement of left ventricular systolic function, ECMO was removed 10 days after operation. Unfortunately, this patient died due to septic shock around 1 month later owing to the necrotizing fasciitis of right lower leg, where atrial cannula was applied through femoral artery. Even though he finally expired, the role of ECMO to control vital sign during emergent pheochromocytoma crisis is meaningful. Discussion Point When we meet rapidly aggravated pheochromocytoma crisis, using ECMO during early resection of pheochromocytoma surgery is useful to manage vital deterioration.
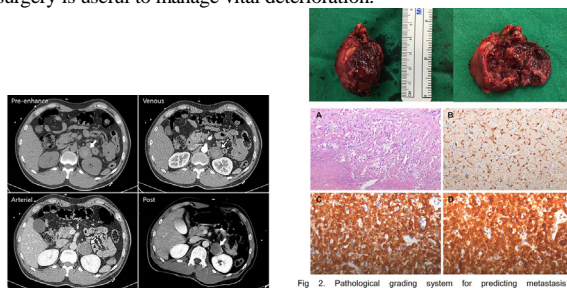

Fig 1. A-C, Low dose dynamic CT for evaluation of aorta and D, routine abdominopelvic CT, A. Axial pre-contrast CT shows a 3.7cm mass with internal high density in the left adrenal gland. B Arterial phase image shows no definite internal enhancement compared with pre-contrast image. C and D. Venous phase images with low dose protocol(C). And routine dose protocol(D, 9-hr delayed image) demonstrate peripherally confined enhancement with rarely enhanced central portion, suggests central necrosis.
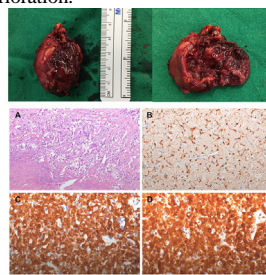

Fig 2. Pathological grading system for predicting metastasis in pheochromocytoma and paraganglioma : 4 points, (moderate cellularity(1 point), extensive comedo necrosis(2 points) , Ki-67 labelling index 1%(1 point))
Pheochromocytoma shows positive immunohistochemical staining for neuroendocrine markers including synaptophysin, chromogranin, NSE, and CD56. (A) Polygonal or spindle cells arranged in small nests(Zellballen) with pale eosinophilic staining (Hematoxylin and eosin staining (x 200)). (B) scattered sustentacular cells (S-100 staining (x 200)). (C) Chromogranin staining (x 400). (D) Synaptophysin staining (x 400)

Prevalence of Rheumatoid Arthritis and Association with Coronary Artery Disease in Korea

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Background/Aims: Rheumatoid arthritis (RA) is known to be associated with coronary artery diseases (CAD). Previous studies of the association between RA and CAD were reported mainly in non-Asian groups. We aimed to examine the prevalence of RA and the relationship between RA and CAD in South Korea. **Methods:** We conducted a nationwide cross-sectional study by using the Korea National Health and Nutrition Examination Survey, which collected data for four years between 2008 and 2012. A total of 25,828 eligible participants were included. To balance the distribution of baseline characteristics, we used propensity score-matching. A multivariable logistic regression model was employed and we calculated the odds ratios (ORs) and 95% confidence intervals (CI) for the odds of the participants with RA on CAD prevalence. **Results:** The prevalence of RA in Korea from 2008 to 2012 was 1.9% and RA predominated among elderly women. The prevalence of CAD in patients with RA was significantly higher than in general population. After propensity score-matching to balance the confounding factors, RA was significantly associated with CAD (OR 2.68, 95% CI 1.62–4.45, P <0.001). **Conclusions:** The prevalence of RA in South Korea was relatively high to the worldwide data, and the presence of CAD in RA patients was more than two-fold. Patients with RA should be examined for CAD for early diagnosis and management.

Table 1. Prevalence of rheumatoid arthritis in Korea

Age	Prevalence of RA		Weighted prevalence of RA, n (%)	
	Female, n (%)[†]	Overall, n (%)[‡]	Female, n (%)[†]	Overall, n (%)[‡]
Overall age	562 (82.4)	682 (2.6)	2,271,574 (79.9)	2,843,713 (1.9)
Age, years				
<40	38 (71.1)	53 (0.7)	223,291 (68.4)	326,265 (0.5)
40–49	54 (80.6)	67 (1.4)	297,183 (71.6)	414,788 (1.3)
50–59	123 (84.2)	146 (3.2)	562,929 (80.2)	701,711 (2.7)
60–69	166 (84.3)	197 (4.6)	555,814 (84.3)	659,370 (4.2)
≥ 70	181 (82.6)	219 (5.5)	632,357 (85.3)	741,580 (5.5)

[†] Data show the percentage of female.

[‡] Data show the proportion with RA in the total population.

RA: rheumatoid arthritis.

Table 2. Influence of rheumatoid arthritis on coronary artery disease

Variables	OR before PS-matching			OR after PS-matching		
	OR	95% CI	P for trend	OR	95% CI	P for trend
RA[†]	4.49	4.47–4.51	< 0.001	2.68	1.62–4.45	< 0.001
Age	1.07	1.07–1.07	< 0.001	1.03	1.01–1.05	0.002
Female sex	0.85	0.85–0.86	< 0.001	1.14	0.61–2.15	0.68
Alcohol Intake			< 0.001			
Nondrinker	1.00			1.00		
Moderate drinker	0.54	0.54–0.54		1.06	0.45–2.49	0.90
Heavy drinker	1.05	1.04–1.05		0.35	0.05–2.59	0.30
Current smoker	0.60	0.59–0.60	< 0.001	0.90	0.41–2.00	0.80
Degree of obesity			< 0.001			
Low	1.00			1.00		
Normal	3.99	3.95–4.04		-	-	NA
Obese	6.22	6.15–6.29		-	-	NA
Hypertension	5.77	5.76–5.79	< 0.001	2.29	1.45–3.63	< 0.001
Dyslipidemia	5.42	5.40–5.43	< 0.001	2.49	1.49–4.15	< 0.001
Diabetes mellitus	4.80	4.79–4.81	< 0.001	1.72	0.98–3.02	0.06

[†] Adjusted for age, sex, alcohol intake and smoking status, body mass index, hypertension, dyslipidemia and diabetes mellitus.

RA: rheumatoid arthritis; PS: propensity score; OR: odds ratio; 95% CI: 95% confidence interval.