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Twenty-eight-year temporal trends of treatment strategy and short-term outcomes in patients with high-risk pulmonary embolism: impact of ESC guidelines changes

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Background: Thrombolysis has been recommended for high-risk pulmonary embolism (PE) in ESC guidelines, used as a reference in Japan. Recently, indication of thrombolysis for acute PE has been limited with recent guideline revision. Little is known regarding trends of treatment strategy and mortality in high-risk PE patients.

Purpose: To clarify temporal trends of treatment strategy and short-term outcomes in high-risk PE patients.

Methods: A retrospective analysis of therapeutic interventions and short-term outcomes was performed for 52 consecutive high-risk PE patients including cardiac arrest. According to timing of ESC guidelines update (2000, 2008 and 2014), patients were divided into four time periods: 1992 to 2000, 2001 to 2008, 2009 to 2014, and 2015 to 2018.

Results: Mean age and proportion of male were not different over the pe-

riod. Nosocomial case decreased from 100% to 25% ($p < 0.01$). Postoperative cases (relative contraindication for thrombolysis) included 43% of all patients. Cardiac arrest and VA-ECMO use were 42% and 21% of all patients. Any thrombolytic therapy including catheter-directed intervention showed a non-significant decrease trend (92%-87%-71%-44%, $p = 0.067$). Temporary or retrieval IVC filter insertion showed a significant downward trend (36%-80%-54%-22%, $p = 0.025$). The entire study 30-day mortality was 23%. There was no significant difference in 30-day mortality over the periods (14%-27%-14%-44%, $p = 0.303$). However, major bleeding decreased significantly (71%-40%-7%-22%, $p = 0.004$) (Table).

Conclusion: The temporal analysis identified a decreased trend in any thrombolytic therapy and IVC filter insertion in high-risk PE. The study also found a decreasing trend in major bleeding.

Table 1

	1992–2000 (n=14)	2001–2008 (n=15)	2009–2014 (n=14)	2015–2018 (n=9)	p
Age (years)	54±12	59±17	64±13	65±16	0.224
Male	29%	13%	29%	44%	0.269
Any thrombolytic therapy	92%	87%	71%	44%	0.067
Catheter-directed therapy	86%	87%	71%	0%	<0.01
with thrombolytics	(92%)	(83%)	(90%)		
without thrombolytics	(8%)	(17%)	(10%)		
Only intravenous thrombolysis	8%	7%	7%	44%	0.038
Temporary/retrieval IVC filter	36%	80%	54%	22%	0.025
ICU stay (days)	15±14	10±18	5±4	8±8	0.206
30-day mortality	14%	27%	14%	44%	0.303
Major bleeding	71%	40%	7%	22%	0.004