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뇌혈관질환의 장기 사망률 연구

삼성생명보험 주식회사

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Long-term mortality in cerebrovascular disease

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Ⅰ. Background & Purpose

To calculate accurate estimates of both the absolute mortality rates and the pattern of mortality in cerebrovascular disease over time, this study is designed to examine the patterns of mortality over 5-year period in a cohort of patients aged ≥ 65 who survived hospitaization for acute ischemic stroke, TIA, and carotid stenosis in the United States.

Ⅱ. Subjects Studied

A cohort of patients with cerebrovascular disease was assembled from fee-for-service Medicare beneficiaries aged ≥ 65 years who had been discharged with a primary discharge diagnosis of acute ischemic stroke, TIA, or carotid stenosis from any acute care hospital in Connecticut during the period January 1, 1995 through December 31, 1995. The index hospitalization was defined as the first or only hospitalization the patient had in 1995 with a principal discharge diagnosis from one of the following ICD-9-CM codes: 433(carotid stenosis), 434(cerebrovascular occlusion), 435(TIA), and 436(acute cerebrovascular disease). Given the evidence that ICD-9-CM codes 434 and 436 are the most specific for acute ischemic stroke, the cerebrovascular occlusion (code 434) and acute cerebrovascular disease (code 436) patients were combined into a group referred to as "acute ischemic stroke" patients.

Ⅲ. Follow - up

The annual part A Medicare claims files for those patients with cerebrovascular disease were linked to follow the cohort forward in time from their index hospitalization in 1995 through December 31, 2000. These medicare data were linked to Social Security files to determine each patient's mortality status. The

primary outcome measure was all-cause mortality.

A total of 5123 patients were hospitalized in an acute care hospital in Connecticut with a diagnosis of acute ischemic stroke, TIA, or carotid stenosis during the calender year 1995. The in-hospital mortality was 6.7% (342/5123), with 4781 patients surviving their index hospitalization. These 4781 patients were followed for an average of 3.4 years(median, 4.6 years; range, 1 day to 5 years); no patients were lost to follow-up; and 19 of 4781 patients(0.4%) were transferred to another acute hospital.

Ⅳ. Discussion

1. Majority of patients(52.6%) who survive a hospitalization for CVA will die within 5 years.
2. Mortality results of this study are similar to previous study.
   1) Retchin's study on Medicare beneficiaries with major stroke
      → 3 year cumulative mortality rate 43%
   2) Petty's study on a cohort of 1st stroke from Rochester
      → 1 year cumulative mortality rate 27%
   3) Danish MONICA Study Group on a community cohort with a 1st stroke from Copenhagen
      → 1 year cumulative mortality rate 41%
      → constant 10% annual mortality rate for each year thereafter
3. Mortality rates varied according to the CVA discharge code.
   1) carotid stenosis : lowest mortality rate
   2) acute ischemic stroke : highest mortality rate

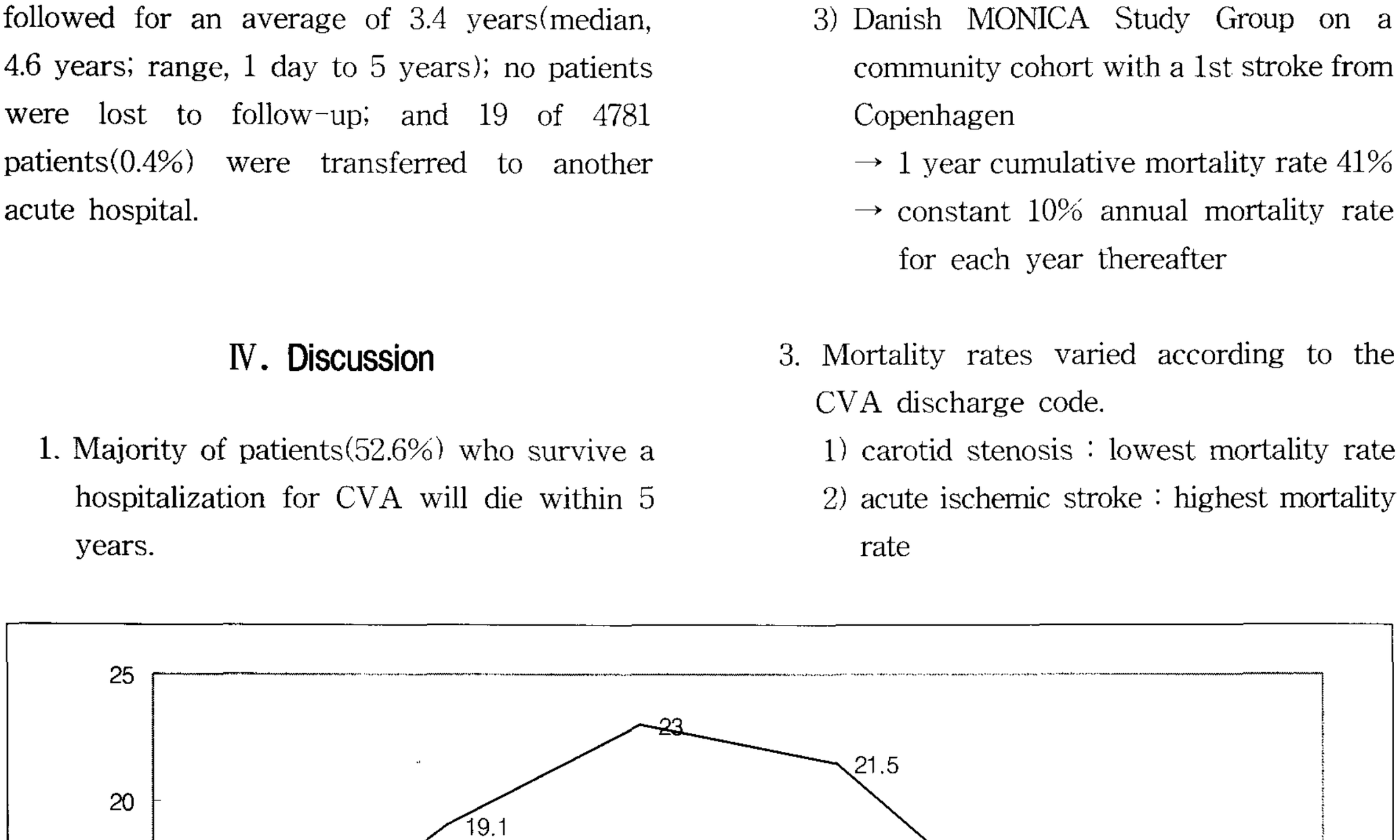

Figure 1. Age distribution

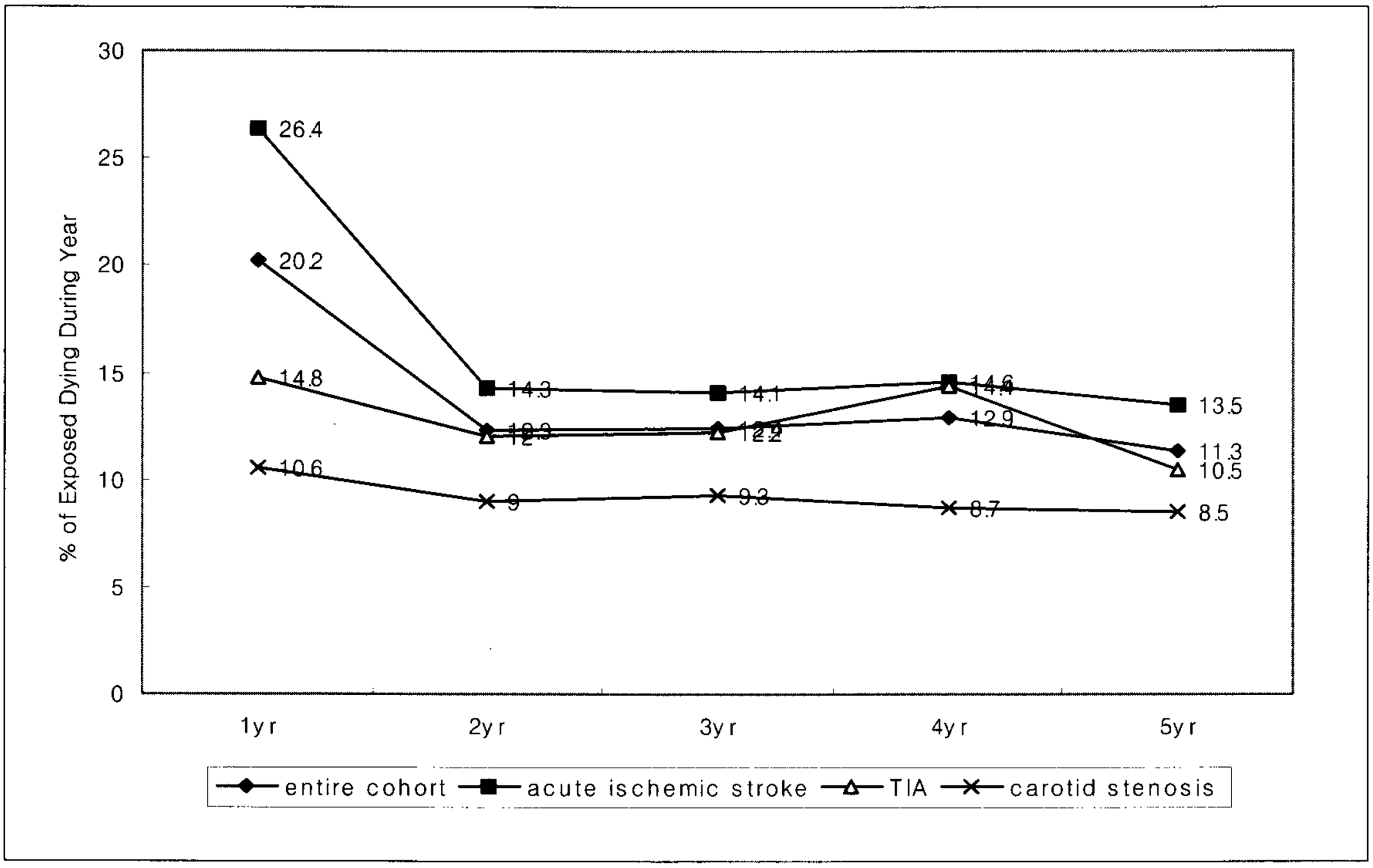

Figure 2. % of exposed dying during year.

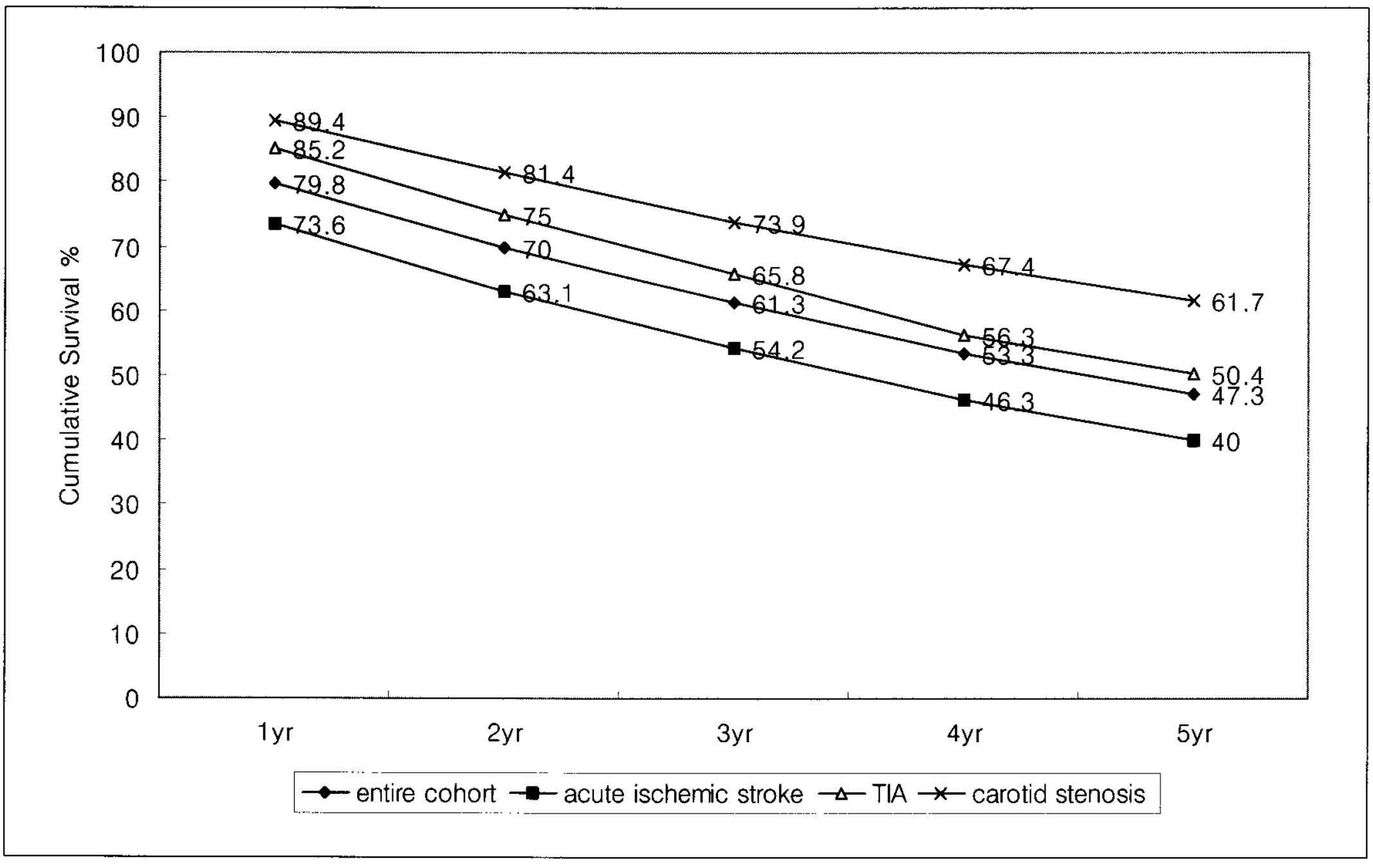

Figure 3. Cumulative survival curve in cerebrovascular disease.

4. Strength of this cohort study
   1) This cohort was treated at a variety of hospital types (academic and community) → so, enhanced generalizability
   2) possible to assemble a large, geographically based cohort
   3) no loss to follow up.

But this cohort study have some limitations.
1) not applicable to young patients with stroke
2) not applicable to those enrolled in managed care programs
3) administrative data without detailed clinical information

Table 1. Mortality table for Carotid stenosis.

interval	No. alive	lost or	Exposure			Mortality	Mortality					
start-end	at start	withdrawn	Person-yrs	Obs.death	Exp.death	Ratio	Ratio				EDR	EDRgeo EDRagg
t to t+	l	w	E	d	d′	100(d/d′)	95%CI	MR	q	q′	100(q-q′)	
0-1yr	1,099	0	1,099	116	58.59	198	162~234	0.10555	0.05331		52	
2-3yr	895	0	895	83	58.31	142	112~173	0.09274	0.06515		28	
3-4yr	812	0	812	71	58.29	122	93~150	0.08744	0.07179		16	
4-5yr	741	0	741	63	58.12	108	82~135	0.08502	0.07843		7	
									*Connecticut white total			
0 - 5yr	1,099	0	1,099	421	291.21	133	131~158	0.38308	0.28754		73	81
1 - 5yr	983	0	983	305	232.62	125	116~146	0.31027	0.24742		54	55

Table 2. Mortality table for Ischemic stroke.

interval	No. alive	lost or	Exposure			Mortality	Mortality					
start-end	at start	withdrawn	Person-yrs	Obs.death	Exp.death	Ratio	Ratio				EDR	EDRgeo EDRagg
t to t+	l	w	E	d	d′	100(d/d′)	95%CI	MR	q	q′	100(q-q′)	
0-1yr	2,603	0	2,603	688	138.77	496	459~533	0.26431	0.05331		211	
1-2yr	1,915	0	1,915	273	112.79	242	213~271	0.14256	0.0589		84	
2-3yr	1,642	0	1,642	232	106.98	217	189~245	0.14129	0.06515		76	
3-4yr	1,410	0	1,410	206	101.22	204	176~231	0.14610	0.07179		74	
4-5yr	1,204	0	1,204	162	94.43	172	145~198	0.13455	0.07843		56	
									*Connecticut white total			
0 - 5yr	2,603	0	2,603	1561	554.19	282	268~296	0.59969	0.28754		102	115
1 - 5yr	1,915	0	1,915	873	415.42	210	196~224	0.45587	0.24742		73	74

Table 3. Mortality table for TIA.

interval	No alive	lost or	Exposure			Mortality	Mortality					
start-end	at start	withdrawn	Person-yrs	Obs.death	Exp.death	Ratio	Ratio				EDR	EDRgeo EDRagg
t to t+	l	w	E	d	d′	100(d/d′)	95%CI	MR	q	q′	100(q-q′)	
0-1yr	1,079	0	1,079	160	57.52	278	235~321	0.14829	0.05331		95	
1-2yr	919	0	919	110	54.13	203	165~241	0.11970	0.0589		61	
2-3yr	809	0	809	99	52.71	188	119~151	0.12237	0.06515		57	
3-4yr	710	0	710	102	50.97	200	161~239	0.14366	0.07179		72	
4-5yr	608	0	608	64	47.69	134	101~167	0.10526	0.07843		27	
									*Connecticut white total			
0 - 5yr	4,125	0	4,125	535	263.01	203	186~221	0.49583	0.28754		62	67
1 - 5yr	3,046	0	3,046	375	205.49	182	164~201	0.40805	0.24742		54	56

Table 4. Mortality table for stroke (total).

interval	No. alive	lost or	Exposure			Mortality	Mortality					
start-end	at start	withdrawn	Person-yrs	Obs.death	Exp.death	Ratio	Ratio				EDR	EDRgeo EDRagg
t to t+	l	w	E	d	d′	100(d/d′)	95%CI	MR	q	q′	100(q-q′)	
0-1yr	4,781	0	4,781	964	254.88	378	354~402	0.20163	0.05331		148	
1-2yr	3,817	0	3,817	471	224.82	210	189~229	0.1234	0.0589		64	
2-3yr	3,346	0	3,346	414	217.99	190	172~208	0.12373	0.06515		59	
3-4yr	2,932	0	2,932	379	210.49	180	162~198	0.12926	0.07179		57	
4-5yr	2,553	0	2,553	289	200.23	144	128~161	0.11320	0.07843		35	
									*Connecticut white total			
0 - 5yr	4,781	0	4,781	2517	1108.41	227	218~236	0.52646	0.28754		73	81
1 - 5yr	3,817	0	3,817	1553	853.53	182	173~191	0.40686	0.24742		54	55

Reference

1. "Long-term mortality in cerebrovascular disease" Dawn M. Bravata, Shie-Yieh Ho, Lawrence M. Brass, John Concato et al. Stroke. 2003;34:699-704