














DATA ARTICLE

The Japanese Catheter Ablation Registry (J-AB): Annual report in 2021

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Abstract

The Japanese Catheter Ablation (J-AB) registry, started in August 2017, is a voluntary, nationwide, multicenter, prospective, observational registry, performed by the Japanese Heart Rhythm Society (JHRS) in collaboration with the National Cerebral and Cardiovascular Center using a Research Electronic Data Capture system. The purpose of this registry is to collect the details of target arrhythmias, the ablation procedures, including the type of target arrhythmias, outcomes, and acute complications in the real-world settings. During the year of 2021, we have collected a total of 89 609 procedures (mean age of 66.1 years and 65.9% male) from 506 participant hospitals. Detailed data are shown in Figures and Tables.

KEYWORDS

catheter ablation, complication, J-AB, REDCap, registry

Catheter ablation has become an established therapy for the management of various cardiac arrhythmias and the procedure number has been dramatically increasing. However, little is known about the details of target arrhythmias, the ablation procedures, including the type of target arrhythmias, outcomes, and acute complications in the real-world settings.

There are several preceding registries of catheter ablation, but the majority of which collected data from selected centers and/or selected arrhythmia and/or specified months to reveal the current status of ablations.¹⁻³ Accordingly, we conducted a nationwide, multicenter, prospective, observational registry in Japan, named Japanese Catheter Ablation (J-AB) registry, aiming to register all

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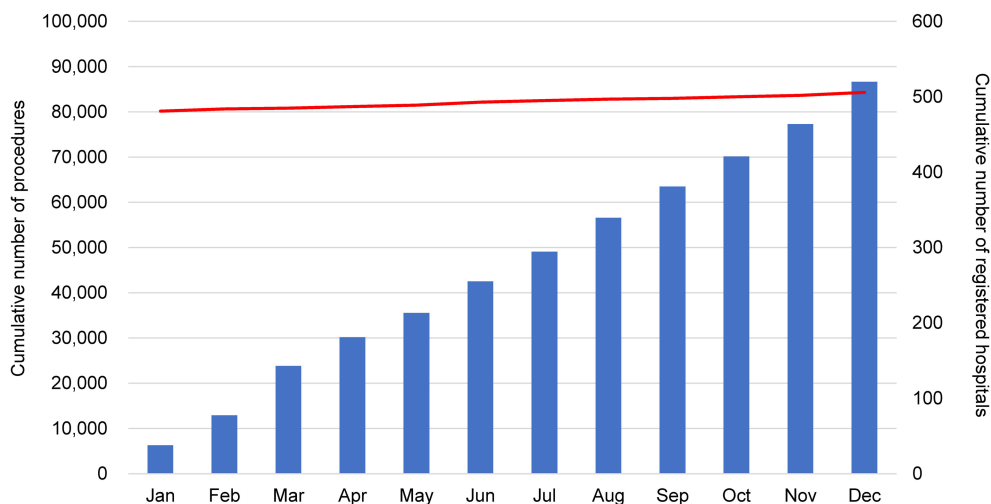


FIGURE 1 Cumulative number of registered hospitals (red line) and the patients (blue bars) during the year of 2021.

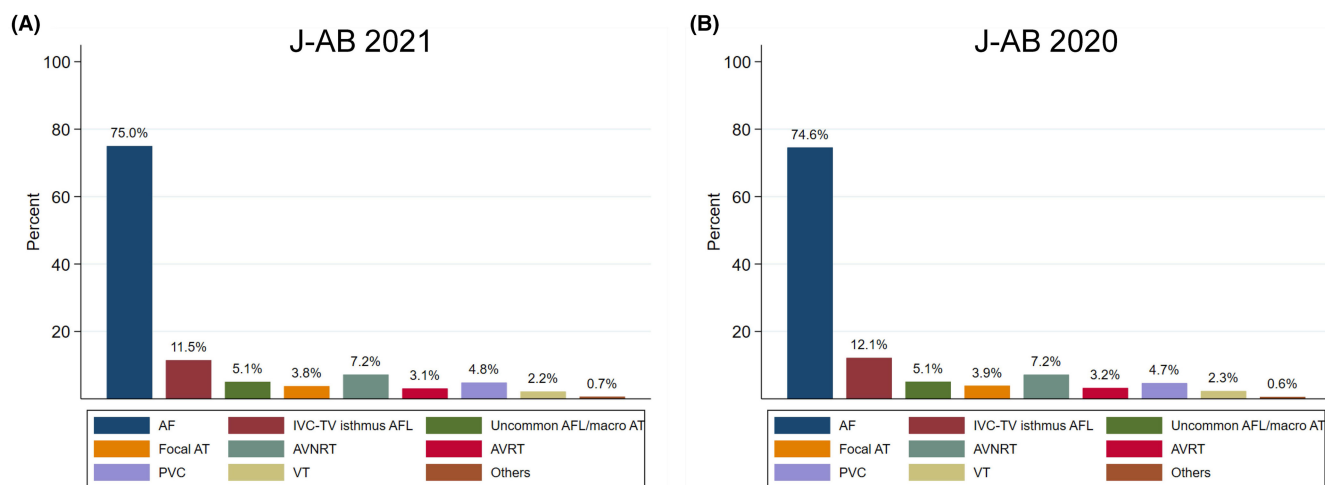


FIGURE 2 The number and rate of the target arrhythmias in the J-AB registry 2021 (89 609 procedures; A) and 2020 (84 591 procedures; B). AF, atrial fibrillation; AFL, atrial flutter; AT, atrial tachycardia; AVNRT, atrioventricular nodal reentrant tachycardia; AVRT, atrioventricular reentrant tachycardia; IVC, inferior vena cava; PVC, premature ventricular contraction; TV, tricuspid valve; VT, ventricular tachycardia.

catheter ablation cases in Japan.⁴ This registry has been performed by the Japanese Heart Rhythm Society (JHRS) in collaboration with the National Cerebral and Cardiovascular Center using a Research Electronic Data Capture (REDCap) system. This study has been performed under the approval from the Institutional Review Board (IRB) of the National Cerebral and Cardiovascular Center (M28-114-7, approved at Dec 21, 2016), Japan, along with the IRBs of all participating hospitals. All participants were provided the informed consent either by a written paper or by an optout fashion and could withdraw their consent at any time. This study was also registered in the UMIN Clinical Trial Registry (UMIN 000028288) and [ClinicalTrials.gov](https://www.clinicaltrials.gov) (NCT03729232). This J-AB registry started

in August 2017, since then the number of participating hospitals has increased to over 400 at the end of 2019. Annual data during the year of 2018, 2019, and 2020 have been already reported,⁵⁻⁷ and now, we report here the annual report of the results during the year of 2021. Figure 1 shows that the cumulative number of registered hospitals and the patients during the year of 2021. Figure 2 shows that the number and rate of the target arrhythmias. AF ablation was the leading procedure (75.0% of all ablation procedures) in 2021, and the percentage of patients over 75 years of age was 28.3% in 2021. Patient characteristics, acute outcomes, and acute complications of all and AF procedures are shown in Tables 1-3, respectively.

TABLE 1 Patient characteristics.

	Atrial fibrillation (AF)			Atrial flutter (AFL)/atrial tachycardia (AT)				Ventricular tachycardia (VT)						
	All AF	Paroxysmal AF (PAF)	Non-PAF	All AFL/AT	IVC-TV isthmus dependent AFL	Uncommon AFL/macro AT	Focal AT	Atrioventricular nodal reentrant tachycardia	Atrioventricular reentrant tachycardia	Premature ventricular contraction	Idiopathic VT	VT because of ischemic cardiomyopathy	VT because of nonischemic cardiomyopathy	VT because of CHD
N	89609	37467	28844	15395	9605	3957	2894	6467	2753	4314	778	459	570	21
Age, mean ± SD	66.1 ± 13.2	67.9 ± 11.1	67.7 ± 10.3	68.8 ± 12.7	69.0 ± 11.9	70.4 ± 12.0	66.2 ± 15.8	59.1 (16.7)	48.4 (20.5)	57.9 (16.7)	55.8 (18.7)	69.8 (9.5)	64.6 (12.7)	46.5 (17.4)
Gender, male	59 019 (65.9%)	46 127 (68.7%)	21 281 (73.8%)	10 415 (67.7%)	7 313 (76.1%)	22 94 (58.0%)	13 95 (48.2%)	2 682 (41.5%)	1 788 (64.9%)	2 402 (55.7%)	530 (68.1%)	417 (90.8%)	463 (81.2%)	18 (85.7%)
Heart diseases	20 209 (22.6%)	14 709 (21.9%)	7 555 (26.2%)	5 121 (33.3%)	3 093 (32.2%)	1 821 (46.0%)	816 (28.2%)	558 (8.6%)	201 (7.3%)	862 (20.0%)	175 (22.5%)	—	—	—
IHD	6 853 (7.6%)	5 048 (7.5%)	2 184 (7.6%)	1 455 (9.5%)	9 93 (10.3%)	3 82 (9.7%)	1 82 (6.3%)	1 89 (2.9%)	6 8 (2.5%)	3 11 (7.2%)	5 4 (6.9%)	—	3 6 (6.3%)	0 (0%)
Cardiomyopathy	6 001 (6.7%)	4 418 (6.6%)	2 828 (9.8%)	1 300 (8.4%)	7 84 (8.2%)	4 44 (11.2%)	2 21 (7.6%)	7 9 (1.2%)	3 8 (1.4%)	3 41 (7.9%)	6 2 (8.0%)	1 3 (2.8%)	—	1 (4.8%)
Valve disease	3 642 (4.1%)	2 332 (3.5%)	1 292 (4.5%)	1 536 (10.0%)	7 75 (8.1%)	7 49 (18.9%)	2 36 (8.2%)	9 0 (1.4%)	1 8 (0.7%)	1 18 (2.7%)	3 1 (4.0%)	2 9 (6.3%)	4 4 (7.7%)	1 (4.8%)
CHD	1 130 (1.3%)	5 70 (0.8%)	2 61 (0.9%)	5 81 (3.8%)	3 41 (3.6%)	2 66 (6.7%)	1 19 (4.1%)	3 7 (0.6%)	3 9 (1.4%)	2 0 (0.5%)	6 (0.8%)	0 (0%)	2 (0.4%)	—

Abbreviations: CHD, congenital heart disease; IHD, ischemic heart disease; SD, standard deviation.

TABLE 2 Acute outcomes.

	2021 n (%)	2020 n (%)	2021-2020 % change
Pulmonary vein isolation of atrial fibrillation (n = 64 922)			
Ablation system		n = 61 757	
RF alone	47 474 (73.12%)	47 022 (76.14%)	-3.02%
Ballon alone (Cryo, hot, laser)	12 212 (18.81%)	9 953 (16.12%)	+2.69%
RF + Ballon combination	4 979 (7.67%)	4 419 (7.16%)	+0.51%
Others	417 (0.64%)	1 72 (0.28%)	+0.36%
Missing	33 (0.05%)	1 91 (0.31%)	-0.26%
Patient with a first session	53 113	50 193	-0.14%
Success	52 707 (99.24%)	49 881 (99.38%)	+0.05%
Unsuccess	279 (0.53%)	240 (0.48%)	+0.10%
Unknown	127 (0.24%)	72 (0.14%)	—
Patient with second session	9 623	9 511	—
Success	7 609 (79.07%)	7 688 (80.83%)	-1.76%
Unsuccess	13 (0.14%)	20 (0.21%)	-0.07%

(Continues)

TABLE 2 (Continued)

	2021 n (%)	2020 n (%)	2021-2020 % change
Already isolated	1950 (20.26%)	1756 (18.46%)	+1.80%
Unknown	51 (0.53%)	47 (0.49%)	+0.04%
Patient with ≥third session	2186	2053	
Success	1226 (56.08%)	1191 (58.01%)	-1.93%
Unsuccess	3 (0.14%)	6 (0.29%)	-0.15%
Already isolated	948 (43.37%)	850 (41.40%)	+1.97%
Unknown	9 (0.41%)	6 (0.29%)	+0.12%
IV-TV isthmus dependent atrial flutter (n = 9605)		n = 9612	
Success	9532 (99.24%)	9544 (99.29%)	-0.05%
Unsuccess	71 (0.74%)	66 (0.69%)	+0.05%
Unknown	2 (0.02%)	2 (0.02%)	+0.00%
Uncommon atrial flutter/ atrial tachycardia (n = 3957)		n = 3746	
Complete success	3392 (85.72%)	3198 (85.37%)	+0.35%
Partial success	366 (9.25%)	356 (9.50%)	-0.25%
Unsuccess	135 (3.41%)	145 (3.87%)	-0.46%
Unknown	64 (1.62%)	47 (1.25%)	+0.37%
Focal atrial tachycardia (n = 2894)		n = 2814	
Complete success	2438 (84.24%)	2354 (83.65%)	+0.59%
Partial success	319 (11.02%)	311 (11.05%)	-0.03%
Unsuccess	106 (3.66%)	107 (3.80%)	-0.14%
Unknown	31 (1.07%)	42 (1.49%)	-0.42%
Atrioventricular nodal reentrant tachycardia by slow-fast (n = 5534)		n = 5247	
Complete success	5418 (97.90%)	5127 (97.71%)	+0.19%
Partial success	80 (1.45%)	74 (1.41%)	+0.04%
Unsuccess	21 (0.38%)	32 (0.61%)	-0.23%
Unknown	15 (0.27%)	14 (0.27%)	+0.00%
Atrioventricular nodal reentrant tachycardia by fast-slow (n = 573)		n = 531	
Complete success	542 (94.59%)	502 (94.54%)	+0.05%
Partial success	17 (2.97%)	24 (4.52%)	-1.55%
Unsuccess	10 (1.75%)	2 (0.38%)	+1.37%
Unknown	4 (0.70%)	3 (0.56%)	+0.14%
Atrioventricular nodal reentrant tachycardia by slow-slow (n = 356)		n = 326	
Complete success	341 (95.79%)	314 (96.32%)	-0.53%
Partial success	10 (2.81%)	7 (2.15%)	+0.66%
Unsuccess	2 (0.56%)	3 (0.92%)	-0.36%

TABLE 2 (Continued)

	2021 n (%)	2020 n (%)	2021–2020 % change
Unknown	3 (0.84%)	2 (0.61%)	+0.23%
Atrioventricular nodal reentrant tachycardia by other (n = 102)		n = 103	
Complete success	85 (83.33%)	86 (83.50%)	-0.17%
Partial success	9 (8.82%)	10 (9.71%)	-0.89%
Unsuccess	2 (1.96%)	3 (2.91%)	-0.95%
Unknown	6 (5.88%)	4 (3.88%)	+2.00%
Atrioventricular reentrant tachycardia by kent (n = 2670)		n = 2672	
Complete success	2586 (96.85%)	2589 (96.89%)	-0.04%
Unsuccess	65 (2.43%)	68 (2.54%)	-0.11%
Unknown	19 (0.71%)	15 (0.56%)	+0.15%
Premature ventricular contraction (n = 4314)		n = 3949	
Complete success	3340 (77.42%)	3031 (76.75%)	+0.67%
Partial success	645 (14.95%)	658 (16.66%)	-1.71%
Unsuccess	247 (5.73%)	216 (5.47%)	+0.26%
Unknown	82 (1.90%)	44 (1.11%)	+0.79%
Idiopathic ventricular tachycardia (n = 778)		n = 806	
Complete success	616 (79.18%)	628 (77.92%)	+1.26%
Partial success	126 (16.20%)	134 (16.63%)	-0.43%
Unsuccess	25 (3.21%)	28 (3.47%)	-0.26%
Unknown	11 (1.41%)	16 (1.98%)	-0.57%
Ventricular tachycardia because of ischemic cardiomyopathy (n = 459)		n = 486	
Complete success	320 (69.72%)	342 (70.37%)	-0.65%
Partial success	97 (21.13%)	111 (22.84%)	-1.71%
Unsuccess	24 (5.23%)	21 (4.32%)	+0.91%
Unknown	18 (3.92%)	12 (2.47%)	+1.45%
Ventricular tachycardia because of nonischemic cardiomyopathy (n = 570)		n = 544	
Complete success	338 (59.30%)	295 (54.23%)	+5.07%
Partial success	165 (28.95%)	177 (32.54%)	-3.59%
Unsuccess	37 (6.49%)	48 (8.82%)	-2.33%
Unknown	30 (5.26%)	24 (4.41%)	+0.85%
Ventricular tachycardia because of CHD (n = 21)		n = 18	
Complete success	18 (85.71%)	15 (83.33%)	+2.38%
Partial success	2 (9.52%)	2 (11.11%)	-1.59%
Unsuccess	1 (4.76%)	1 (5.56%)	-0.80%

Abbreviations: CHD, congenital heart disease; IVC, inferior vena cava; RF, radiofrequency ablation; TV, tricuspid valve.

TABLE 3 Acute complications.

N	2021		2020		2021-2020	
	All patient	AF	All patient	AF	All patient	% change AF
Complications during hospitalization	2088 (2.35%)	1680 (2.52%)	1992 (2.35%)	1578 (2.50%)	0%	+0.02%
Major bleeding (BARC \geq 2)	813 (0.91%)	622 (0.93%)	776 (0.92%)	567 (0.90%)	-0.01%	+0.03%
Cardiac tamponade	473 (0.53%)	333 (0.50%)	490 (0.58%)	335 (0.53%)	-0.05%	-0.03%
Embolism	151 (0.17%)	130 (0.20%)	141 (0.17%)	126 (0.20%)	0%	0%
Phrenic nerve paralysis	261 (0.29%)	254 (0.38%)	254 (0.30%)	245 (0.39%)	-0.01%	-0.01%
Esophagus	129 (0.15%)	126 (0.19%)	99 (0.12%)	98 (0.16%)	+0.03%	+0.03%
Esophagus ulcer	15 (0.02%)	13 (0.02%)	19 (0.02%)	19 (0.03%)	0%	-0.01%
Gastric hypomotility	116 (0.13%)	115 (0.17%)	82 (0.10%)	81 (0.13%)	+0.03%	+0.04%
Atrioesophageal fistula	0 (0.00%)	0 (0.00%)	0 (0.00%)	0 (0.00%)	0%	0%
Pericarditis	101 (0.11%)	79 (0.12%)	110 (0.13%)	91 (0.14%)	-0.02%	-0.02%
Sick sinus syndrome	179 (0.20%)	144 (0.22%)	152 (0.18%)	117 (0.19%)	+0.02%	+0.03%
Atrioventricular block	96 (0.11%)	31 (0.05%)	68 (0.08%)	26 (0.04%)	+0.03%	+0.01%
Death during hospitalization	93 (0.10%)	43 (0.06%)	92 (0.11%)	33 (0.05%)	-0.01%	+0.01%
Cardiac death	43 (0.05%)	16 (0.02%)	54 (0.06%)	14 (0.02%)	-0.01%	0%
Related to ablation therapy	1 (0.001%)	1 (0.002%)	3 (0.004%)	0 (0%)	0%	0%
Non cardiac death	49 (0.06%)	26 (0.04%)	38 (0.04%)	19 (0.03%)	+0.02%	+0.01%
Related to ablation therapy	1 (0.001%)	1 (0.002%)	2 (0.002%)	2 (0.003%)	0%	0%

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CONFLICT OF INTEREST STATEMENT

Kengo Kusano: Speaker honoraria from DAIICHI SANKYO COMPANY, Ltd., Bayer Yakuhin, and Medtronic Japan, and research grants from Medtronic Japan, HITACHI, and JSR.

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ETHICS STATEMENT

This study was approved from the Institutional Review Board (IRB) of the National Cerebral and Cardiovascular Center (M28-114-7, approved at December 21, 2016), Japan, along with the IRBs of all participating hospitals.

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