# Comparison of higher-power and conventional power ablation of atrial fibrillation using contact-force sensing catheters: A systematic review and meta-analysis

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## Abstract

Abstract Background: Contact-force sensing catheters are widely used in catheter ablation. The technique of high-power ablation has gained a growing attention in recent years. Our purpose of this meta-analysis is to compare the efficacy and safety between higher-power and conventional power ablation of atrial fibrillation (AF) by contact-force sensing catheters. Methods: We identified studies through searching MEDLINE, EMBASE, the Web of Science, Scopus and the Cochrane Library from inception up until July 2020. The primary outcomes were the recurrence of atrial tachyarrhythmia and complications. The secondary outcomes were acute reconnections of pulmonary veins(PVs), ablation time, and the total procedural time. Results: We identified four nonrandomized, observational studies (nROS) involving 231 patients with high-power ablation and 239 patients with conventional power ablation. There were insignificant differences in the recurrence rate of atrial tachyarrhythmia (14.2% versus 20.5%, OR: 0.64, 95%CI: 0.39 to 1.04, Z = 1.82, P = 0.07) and clinical complications (1.7% versus 2.5%, OR: 0.72, 95%CI: 0.21 to 2.47, Z = 0.51, P = 0.61) between high-power versus conventional power ablation. The high-power group was fewer in acute PVs reconnections (P = 0.0001) , shorter in ablation time (P < 0.0001) , and the total procedural time (P < 0.0001) compared with conventional power group. Conclusion: High-power ablation of AF was safe and efficient compared with that of conventional power ablation, and reduced ablation time and the total procedural time.

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Table1.docx available at https://authorea.com/users/351511/articles/476175-comparison-ofhigher-power-and-conventional-power-ablation-of-atrial-fibrillation-using-contact-forcesensing-catheters-a-systematic-review-and-meta-analysis

Figure1. Flow diagram of the study selection process.

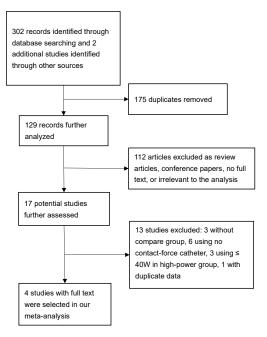


Figure2. Forest plot of the primary outcomes of selected studies comparing high power (HP) versus conventional power (CP) ablation of AF. Fig2A. Forest plot of AF recurrence; Fig2B. Forest plot of Complications.

## A. Forest plot of AF recurrence

	High Po	wer	Conventional Power			Odds Ratio	Odds Ratio
Study or Subgroup	Events Tota		Events	Total	Weight	M-H, Fixed, 95% CI	M-H, Fixed, 95% Cl
Berte 2019	14	80	16	94	29.2%	1.03 [0.47, 2.28]	
Ejima 2020	7	60	16	60	34.0%	0.36 [0.14, 0.96]	
Pambrun 2019	5	50	6	50	13.0%	0.81 [0.23, 2.87]	
Vassallo 2019	7	41	11	35	23.7%	0.45 [0.15, 1.33]	
Total (95% CI)		231		239	100.0%	0.64 [0.39, 1.04]	•
Total events	33		49				
Heterogeneity: Chi <sup>2</sup> =	3.27, df =	3 (P = 0	0.35); I <sup>2</sup> = 8%				0.01 0.1 1 10 100
Test for overall effect	Z = 1.82 (	P = 0.0	7)				0.01 0.1 1 10 100 Favours [HP] Favours [CP]

#### B. Forest plot of Complications

	High Po	ower	Conventional	Power		Odds Ratio		Odds Ratio	
Study or Subgroup	Events	Total	Events	Total	Weight	M-H, Fixed, 95% CI		M-H, Fixed, 95% Cl	
Berte 2019	1	80	3	94	44.7%	0.38 [0.04, 3.77]			
Ejima 2020	1	60	0	60	8.0%	3.05 [0.12, 76.39]			
Pambrun 2019	2	50	3	50	47.3%	0.65 [0.10, 4.09]			
/assallo 2019	0	41	0	35		Not estimable			
Fotal (95% CI)		231		239	100.0%	0.72 [0.21, 2.47]		-	
Fotal events	4		6						
Heterogeneity: Chi <sup>2</sup> =	1.07, df =	2 (P = 1	0.58); I <sup>2</sup> = 0%				0.002		-
Test for overall effect	Z=0.51 (	P = 0.6	1)				0.002	0.1 1 10 Favours [HP] Favours [CP]	500

Figure3. Forest plot of the secondary outcome of selected studies comparing high power (HP) versus conventional power (CP) ablation of AF. Fig3A. Forest plot of acute reconnections of pulmonary veins; Fig3B. Forest plot of Ablation time; Fig3C. Forest plot of total procedure time.

#### A. Forest plot of acute reconnection of pulmonary veins

	High Power Conventional Power					Odds Ratio	Odds Ratio					
Study or Subgroup	Events	Total	Events	Total	Weight	M-H, Fixed, 95% Cl		M-H, Fi	ked, 95% CI			
Berte 2019	10	75	18	82	30.1%	0.55 [0.23, 1.28]			+			
Ejima 2020	37	60	47	60	36.3%	0.44 [0.20, 1.00]			-			
Pambrun 2019	2	100	17	100	33.6%	0.10 [0.02, 0.44]	_					
Total (95% CI)		235		242	100.0%	0.36 [0.21, 0.61]		•				
Total events	49		82									
Heterogeneity: Chi <sup>2</sup> =	4.05, df =	2 (P = 1	0.13); I <sup>2</sup> = 51%				0.01	0.1	1	40	100	
Test for overall effect	Z = 3.81 (	P = 0.0	001)				0.01	0.1 Favours (HF	P] Favours	10 [CP]	100	

#### B. Forest plot of Ablation time

	Hig	Pow	ower Conventional Power					Mean Difference				
Study or Subgroup	Mean	SD	Total	Mean	SD	Total	Weight	IV, Random, 95% CI		IV, Rando	m, 95% Cl	
Berte 2019	23	5	80	36	11	94	29.4%	-13.00 [-15.48, -10.52]				
Ejima 2020	17.9	7.2	60	34.9	12.7	60	27.6%	-17.00 [-20.69, -13.31]				
Pambrun 2019	13	2.9	50	30.3	8.8	50	29.3%	-17.30 [-19.87, -14.73]				
Vassallo 2019	31.8	11.3	41	76	33.3	35	13.7%	-44.20 [-55.76, -32.64]				
Total (95% CI)			231			239	100.0%	-19.63 [-25.33, -13.92]		•		
Heterogeneity: Tau <sup>a</sup> = 27.18; Chi <sup>a</sup> = 29.74, df = 3 (P < 0.00001); I <sup>a</sup> = 90%										-50	1 50	100
Test for overall effect	Z = 6.74	(P < (	0.00001	)					-100	Favours [HP]		

## C. Forest plot of total procedure time

	High Power Conventional Power							Mean Difference	Mean Difference			
Study or Subgroup	Mean	SD	Total	Mean	SD	Total	Weight	IV, Random, 95% CI		IV, Rando	m, 95% CI	
Berte 2019	82	18	80	100	22	94	29.2%	-18.00 [-23.94, -12.06]		-		
Ejima 2020	119.3	28.1	60	140.1	51.2	60	20.8%	-20.80 [-35.58, -6.02]				
Pambrun 2019	73.1	18.2	50	107.4	21.2	50	27.7%	-34.30 [-42.04, -26.56]				
Vassallo 2019	106	23	41	148	33.6	35	22.4%	-42.00 [-55.17, -28.83]		_		
Total (95% CI)			231					-28.46 [-39.94, -16.98]		-		
Heterogeneity: Tau <sup>2</sup> = 108.27; Chi <sup>2</sup> = 17.49, df = 3 (P = 0.0006); I <sup>2</sup> = 83%									-100	-50	0 50	100
Test for overall effect	Z = 4.86	i (P < (	0.00001	)						Favours [HP]		

