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## Surgical management of atrio-esophageal fistula after catheter ablation of atrial fibrillation

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The present study was approved by the Institutional Review Board of the French Society of Thoracic and Cardiovascular Surgery (CERC-SFCTCV-2023-04-25\_28215)

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## Background

**Atrio-esophageal fistula (AEF)** is the most feared and life-threatening complication after catheter ablation (CA) of atrial fibrillation (AF). Its incidence remains stable around **0.02 to 0.04%** despite technical improvement and novel energy sources over time with a high mortality rate (**55 to 65%**). Many therapeutic options have been described: medical or conservative treatment, endoscopic treatment alone or associated with surgery and upfront surgical treatment. Some authors have shown a clear benefit in survival of a surgical management for AEF in comparison to endoscopic or medical treatment alone. We aimed to compare different surgical strategies in the management of atrio-esophageal fistula.

## Objective

To compare the efficacy of different surgical strategies for AEF after catheter ablation of atrial fibrillation in a French survey.

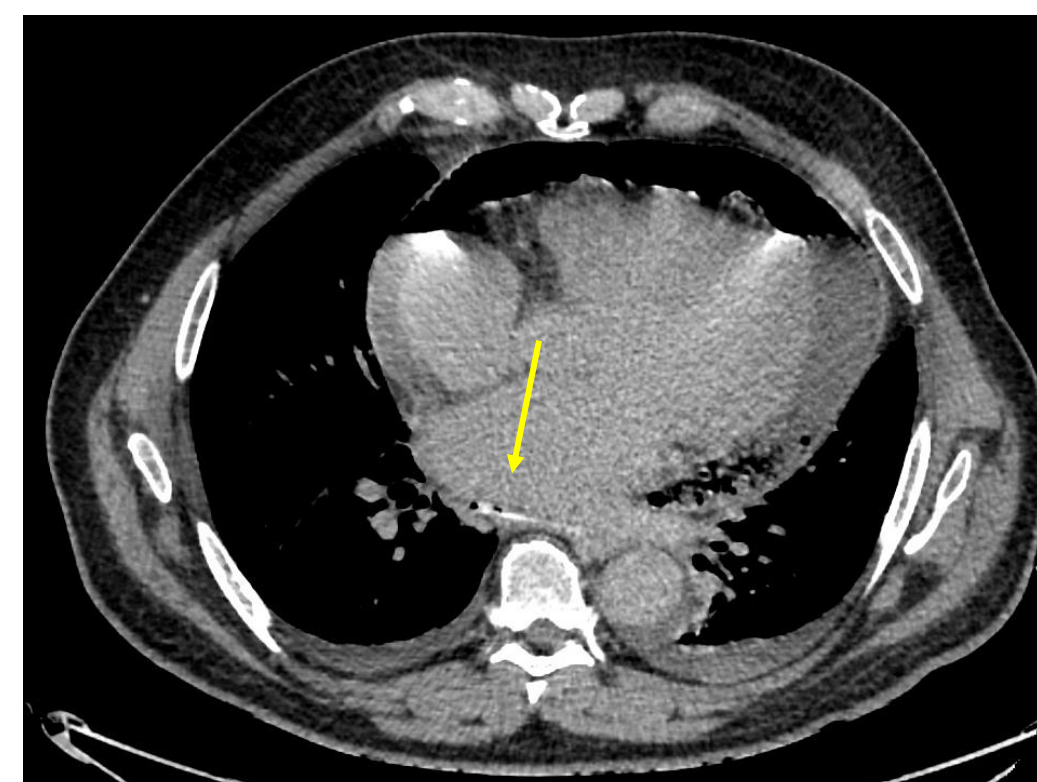
## Methods

Between **January 2010 and April 2023**, all patients with a diagnosis of AEF or pericardo-esophageal fistula (PEF) after catheter ablation of atrial fibrillation were analyzed **retrospectively** from the **French database EPITHOR**. Patients without surgical management were excluded.

## Cohort

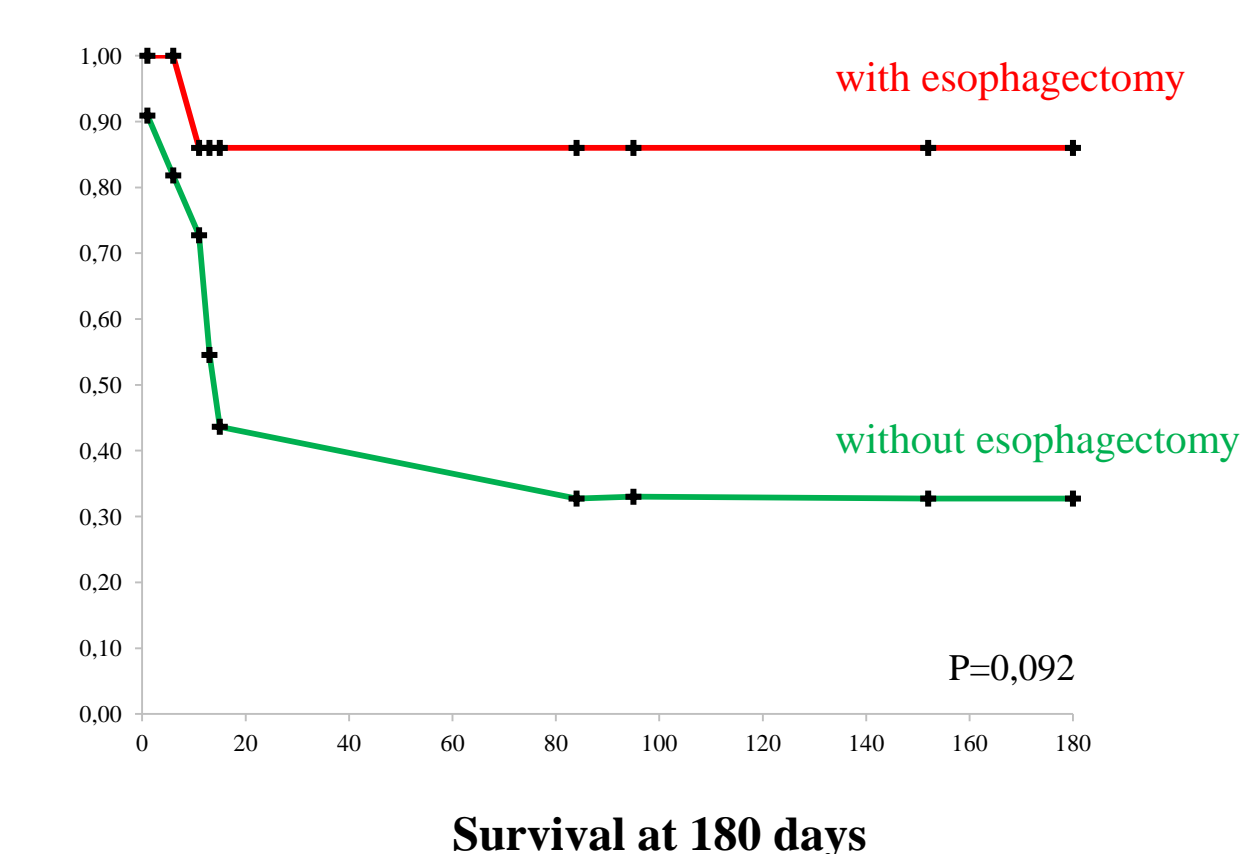
**18 patients** were included, 15 with AEF and 3 with PEF. **Median follow-up was 89.5 days (mean follow-up 768.2 days)** with an **overall survival rate of 50%**.

**Figure 1.** CT Chest scan with contrast esophagogram



The yellow arrow shows a pericardo-esophageal fistula

**Figure 2.** Survival curve according to the use of esophagectomy



Risk of death in multivariate analysis = **SEPSIS**  
(HR 6.25, 95% CI 1.17-33.3; p=0.032)

Surgical direct repair: **33%**

Esophagectomy: **86%**

**Table 1.** Surgical strategies and outcomes

N	Age	Sex	AOF sub-types	Imaging for diagnosis	Esophageal stenting	Surgical strategies	Complications	Restorative surgery	Vital Status	Cause of death
1*	34	M	AEF	Chest CT	-	Sternotomy, CPB, LA patch repair, Esophagus direct suture, Flap interposition	Re Do surgery	-	Deceased	Multi-organ failure
2	72	M	PEF	EGD	-	Sternotomy, CPB, LA direct suture, Esophagus direct suture, Flap interposition	Re Do surgery	-	Deceased	NR
3*	65	M	AEF	Brain CT	-	Sternotomy, Esophageal direct suture, Flap interposition	NR	-	Deceased	NR
4	58	M	PEF	Chest CT	Yes	Sternotomy, CPB, Pericardium direct suture, Esophagus direct suture, Flap interposition	Re Do surgery	-	Alive <sup>§</sup>	-
5*	65	M	AEF	Chest CT contrast esophagogram	Yes	Sternotomy, CPB, LA direct suture, Thoracotomy, Esophagus direct suture, Flap interposition	NR	-	Deceased	Coma
6*	64	M	AEF	TTE	-	Thoracotomy, Esophagus direct suture, Flap interposition	NR	-	Deceased	Coma
7	69	F	PEF	Chest CT	-	Thoracotomy, partial esophagectomy, Flap interposition	NR	Yes <sup>a</sup>	Alive <sup>§</sup>	-
8*	49	M	AEF	Brain CT	-	Thoracotomy, CPB, LA direct suture, Esophagus direct suture, Flap interposition	NR	-	Deceased	Cardiopulmonary arrest
9	55	M	AEF	EGD	-	Clamshell, CPB, LA direct suture, Esophagus direct suture, Flap interposition	NR	-	Alive <sup>§</sup>	-
10*	66	M	AEF	Chest CT	-	Clamshell, CPB, LA direct suture, Esophagus direct suture, Flap interposition	NR	-	Deceased	Coma
11*	70	F	AEF	EGD	-	Clamshell, CPB, LA patch repair, Esophagus direct suture, Flap interposition	NR	-	Alive <sup>§</sup>	-
12	44	M	AEF	Chest CT	-	Thoracotomy, CPB, LA patch repair, Esophagectomy	NR	Yes <sup>b</sup>	Alive <sup>§</sup>	-
13*	65	M	AEF	EGD	Yes	Thoracotomy, LA patch repair, Esophagectomy	Re Do surgery	-	Deceased	Multi-organ failure
14*	52	M	AEF	Chest CT	-	Thoracotomy, LA patch repair, Esophagectomy	NR	Yes <sup>b</sup>	Alive <sup>§</sup>	-
15	31	M	AEF	Chest CT	Yes	Thoracotomy, CPB, LA patch repair, Esophagectomy	Re Do surgery	Yes <sup>b</sup>	Alive <sup>§</sup>	-
16	64	M	AEF	Chest CT	-	Thoracotomy, CPB, LA patch repair, Esophagectomy	NR	Yes <sup>b</sup>	Alive <sup>§</sup>	-
17	42	M	AEF	Chest CT	-	Thoracotomy, CPB, LA patch repair, Esophagectomy	NR	-	Deceased	Cerebral hemorrhage
18	80	M	AEF	Chest CT contrast esophagogram	Yes	Thoracotomy, LA repair, Esophagus direct suture, Flap interposition	Re Do surgery	-	Alive <sup>§</sup>	-

EGD: esogastroduodenoscopy; NR: Not reported; \*: patient with neurological failure (coma) at initial presentation; #: with sequela; §: without sequela; a: restorative surgery with eso-gastric anastomosis; b: restorative surgery with retrosternal colon interposition

## Main Findings

- 5 patients underwent esophageal stenting, 2 as a bridge-to-esophagectomy with 50% of survival, and 3 in association with esophagus and left atrial direct repair with 66% of survival.
- 8 patients underwent a primary direct esophageal repair with flap interposition, without previous stenting, with 25% of survival.
- 7 patients had an esophagectomy with 71% of survival. 5 patients underwent a restorative surgery and are still alive. 4 patients had a retrosternal colon interposition, whereas one patient had an eso-gastric anastomosis.
- Esophagectomy tended to be associated with better survival (HR 0.163, 95% CI 0,019-1.340; p=0,092).
- Cardiopulmonary bypass was used for twelve patients and did not significantly impact survival (HR 1,953, 95% CI 0,392-9,719; p=0,413).

## Limitation and strength

Only 18 patients were included which can be explained by the rare incidence of AEF. Many surgical strategies were assessed with only few patients in each group, decreasing statistical power and limiting statistical analysis.

However, apart from review of literature, our study is the **largest nationwide cohort** on atrio-esophageal fistula to date.

## Conclusion

Surgical management of AEF is challenging. Sepsis at initial presentation is a risk of death.

Esophagectomy appears to offer the highest survival rate and should be considered as a valuable damage control strategy.