**Original article**

**Study of effect of preoperative anti coagulation in case of LA clot**

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**Abstract:**

LA appendage is the most prominent site of LA thrombus formation, with more than 90% of thrombi generating within this anatomical structure.1 Atrial fibrillation is the most common cardiac arrhythmia and is associated with an increased risk of stroke and thromboembolic complications.Anticoagulant therapy for 3–4 weeks prior to cardioversion is recommended in order to avoid thromboembolic events deriving from restoring sinus rhythm

The transesophageal echocardiogram (TOE) is a diagnostic method that allows a detailed evaluation of the anatomy and function of the left atrial appendage (LAA), and is considered the gold standard for identifying or excluding left atrium (LA) and LAA thrombosis2 The reason for three weeks of anticoagulation before electrical CV derives from a study suggesting that at least 14 days are needed for fibroblastic infiltration and organization of an LAA thrombus 3Thrombus resolution in previously non-anticoagulated patients can be achieved with either a vitamin K antagonist (VKA) or non- vitamin K antagonist oral anticoagulant (NOAC).4 In this study we retrospectively evaluate the effect of preoperative anticoagulation in patients with LA clot with or without atrial fibrillation.

**Keywords**: LA appendage, Atrial fibrillation

**Introduction:**

LA appendage is the most prominent site of LA thrombus formation, with more than 90% of thrombi generating within this anatomical structure.1 Atrial fibrillation is the most common cardiac arrhythmia and is associated with an increased risk of stroke and thromboembolic complications.Anticoagulant therapy for 3–4 weeks prior to cardioversion is recommended in order to avoid thromboembolic events deriving from restoring sinus rhythm

The transesophageal echocardiogram (TOE) is a diagnostic method that allows a detailed evaluation of the anatomy and function of the left atrial appendage (LAA), and is considered the gold standard for identifying or excluding left atrium (LA) and LAA thrombosis2 The reason for three weeks of anticoagulation before electrical CV derives from a study suggesting that at least 14 days are needed for fibroblastic infiltration and organization of an LAA thrombus 3Thrombus resolution in previously non-anticoagulated patients can be achieved with either a vitamin K antagonist (VKA) or non- vitamin K antagonist oral anticoagulant (NOAC).4 In this study we retrospectively evaluate the effect of preoperative anticoagulation in patients with LA clot with or without atrial fibrillation.

**Aim:**

To study and evaluate the effect of preoperative anti coagulation in cases of mitral stenosis with Left atrial clot

**Materials and methods** :

* This is a retrospective cross sectional study of all patients undergoing mitral valve replacement in our institute during 2021-2023 for severe mitral stenosis with or without mitral regurgitation with Left atrial clot in preoperative trans thoracic echo evaluation.
* All patients operated for Severe mitral stenosis with LA clot as identified by trans thoracic echo were identified
* Inclusion criteria
* Ages between 16 – 70 were included
* Patients with mild to moderate mitral regurgitation were included
* Patients with isolated mitral regurgitation in absence of stenosis were not included
* Patients with multiple valve replacement were not included
* Patients over 40 years underwent CAG evaluation and those found to have CAD were excluded
* All patients underwent a TEE evaluation intra operatively prior to incision
* All patients were cleared for surgery by the anaesthesia team
* Thorough history and clinical evaluation were done prior to selecting the patients
* Patients with thromboembolic episodes were included and were considered for surgery after recovery from acute embolism and clearance from neurologist
* Patients with poor pulmonary compliance or those who underwent a previous cardiac surgery were excluded
* Patients without LA clot preoperatively but on anticoagulation for AF or any other cause are not included
* All patients received 2.5 mg od dose of warfarin preoperatively with maintenance of inr around 2
* All patients underwent surgery via midline sternotomy and bicaval aortic cannulation
* Cardioplegia used was st Thomas and heart was arrested in diastole
* LA opened through sondergaards groove and MVR done using either metallic or bio prosthetic valve from ST Judes as indicated and available in our hospital
* Cases were shifted to step down icu and anticoagulation, warfarin/ acitrom was started from pod 1 with low molecular heparin cover

**Results:**

In our study 60 patients with LA clots on preop TTE were considered

Out of 60 patients 48 patients (80%) had a clot on TEE and 12 patients(20%) did not have a clot on TEE

Out of 60 patients 40 patients (66.7%) had a clot intraop whereas 20 patients (33.3%) did not have a clot intraoperatively

Table 1: Patients with LA clot in TEE and OT

|  |  |  |  |
| --- | --- | --- | --- |
|  | | Count | Column N % |
| TEE clots | Yes | 48 | 80.0% |
| No | 12 | 20.0% |
| Intraoperative Clots | Yes | 40 | 66.7% |
| No | 20 | 33.3% |

Table 2: patients with a clot in preop echo and no clot in TEE

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Count | | | | |
|  | | TEE clots | | Total |
| Yes | No |
| Pre-op echo | Yes | 48 | 12 | 60 |
| Total | | 48 | 12 | 60 |

out of 48 patients with clot on TEE, 40 patients had a decrease in size of clot and 3 patients had an increase in clot size whereas 5 patients had no change in size

out of 40 patients with clot intraop 32 patients had a decrease in size of clot intra operatively and 5 patients had an increase in size of clot whereas 3 patients had no change in size

**Table 3: patients with a clot in preop echo with a decrease in size in TEE and OT**

|  |  |  |
| --- | --- | --- |
|  | | TEE |
| Decrease | No change | Increase |  |
| Pre-op echo | Yes 60 | 40 | 5 | 3 | 48 |
| Total | | 40 | 5 | 3 | 48 |

|  |  |  |
| --- | --- | --- |
|  | | OT |
| Decrease | No change | Increase |  |
| Pre-op echo | Yes 60 | 32 | 5 | 3 | 40 |
| Total | | 40 | 5 | 3 | 40 |

Out of 60 patients with LA clot 48 had a clot on TEE and 12 had no clot on TEE whereas 40 patients had a clot intra op while 20 had no clot in intraop

**Table 4: patients with a clot in OT but no clot in preop echo or TEE**

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | | | | | Total | Chi-square | | p-value | | |
| Yes | | | No | |
| TEE | | 48 | 12 | | 60 | | | 1.875 | | 0.171 |
| Intraop | | 40 | 20 | | 60 | | |

Out of 60 patients with LA clot, 11 patients were on anticoagulation for <3 weeks and out of them 6 patients ahd a decrease in size of clot on TEE while 5 patients had no change

40 patients were on anticoagulation for >3 weeks and 37 had a decrease in size of clot while 5 patients had no change in size

9 patients were not on any anticoagulation and 2 of them had a decrease in size of clot on TEE while 2 had no change in size and 5 patients had a an increase in size of clot

This shows a statistical significance of anticoagulation on size of clot due to anticoagulation as per TEE

Out of 11 patients on anticoagulation <3 weeks 8 patients had a decrease in size of clot as identified intraop while 1 had increase in size and 2 had no change in size intraop

Out of 40 patients on anticoagulation >3 weeks none had an increae in size of clot while 37 had a significant decrease in size of clot and 3 had no change

Out of 9 patients off anticoagulation 2 had a. decrease in size, 3 had an increase in size whereas 4 had no change as seen intraop

**Table 6: comparing patients with anticoagulation <3 weeks and >3 weeks by**

1. **decrease/increase in size of the clot by TEE**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | | Pre-op Vs TEE | | | Total | Chi-square | p-value |
| Decrease | Increase | No change |
| Duration of Anticoagulation  (AC) | </=3 weeks | 6 | 0 | 5 | 11 | 41.576 | 0.001\* |
| >3 weeks | 37 | 0 | 3 | 40 |
| No AC | 2 | 5 | 2 | 9 |
| Total | | 45 | 5 | 10 | 60 |

\*Statistically significant (p<0.05)

1. **decrease/increase in size of the clot in operation**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | | Pre-op Vs OT | | | Total | Chi-square | p-value |
| Decrease | Increase | No change |
| Duration of Anticoagulation  (AC) | </=3 weeks | 8 | 1 | 2 | 11 | 22.042 | 0.001\* |
| >3 weeks | 37 | 0 | 3 | 40 |
| No AC | 2 | 3 | 4 | 9 |
| Total | | 47 | 4 | 9 | 60 |

\*Statistically significant (p<0.05)

Out of 60 patients with LA clot 11 had preop MACCE ie 18.3 %

Out of these 60 patients,

2 were those on anticoagulation <3 weeks, 5 weere those on anticoagulation > 3weeks

4 patients among 9 who did not receive any anticoagulation had MACCE showing statistical significance

**Table 7: Incidence of MACCE in LA clot**

|  |  |  |  |
| --- | --- | --- | --- |
|  | | Count | Column N % |
| MACCE  Incidence | Yes | 11 | 18.3% |
| No | 49 | 81.7% |

**Table 8: relation between resolution of LA clot and MACCE in patients on anticoagulation <3 and >3 weeks**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | | MACCE Incidence | | Total | Chi-square | p-value |
| Yes | No |
| Duration of Anticoagulation  (AC) | </=3 weeks | 2 | 9 | 11 | 5.008 | 0.028 |
| >3 weeks | 5 | 35 | 40 |
| No AC | 4 | 5 | 9 |
| Total | | 11 | 49 | 60 |

41 out of 48 patients with LA clotso on TEE were in AF rhythm and 12 wew in sinus rhythm showing statistical significance of AF and LA clot

32 out of 40 having intra op LA clots were in AF rhythm and 8 in sinus rhythm

This shows a statistical significance of AF and clot with p value of 0.02

Out of 20 patietns without clots 15 were in sinus rhythm and 5 in AF rhythm

**Table 9: Relation of the rhythm of the patient and LA clot formation**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | | Rhythm | | Total | Chi-square | p-value |
| Sinus | AF |
| Intra-op clots | Yes | 8 | 32 | 40 | 4.848 | 0.028\* |
| No | 15 | 5 | 20 |
| Total | | 23 | 37 | 60 |

\*Statistically significant (p<0.05)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | | Rhythm | | Total | Chi-square | p-value |
| Sinus | AF |
| TEE clots | Yes | 12 | 36 | 48 | 2.424 | 0.019 |
| No | 9 | 3 | 12 |
| Total | | 21 | 39 | 60 |

Our study showed a statistical significance of anticoagulation non reduction of LA size with a p value of 0.001 43 of 60 patients on TEE and 44 of 60 patients on intraop findings had a decrease n size of LA clot

**Table 10: Efficacy of anticoagulation on clot reduction**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | | Pre-op Vs TEE | | | Total | Chi-square | p-value |
| Decrease | Increase | No change |
| Anticoagulation | Yes | 43 | 0 | 8 | 51 | 32.462 | <0.001\* |
| No | 2 | 5 | 2 | 9 |
| Total | | 45 | 5 | 10 | 60 |

\*Statistically significant (p<0.05)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | | Pre-op Vs OT | | | Total | Chi-square | p-value |
| Decrease | Increase | No change |
| Anticoagulation | Yes | 44 | 1 | 6 | 51 | 20.290 | <0.001\* |
| No | 2 | 3 | 4 | 9 |
| Total | | 46 | 4 | 10 | 60 |

\*Statistically significant (p<0.05)

Our study did not show any statistical significance of anticoagulation on reduction of MACCE as the patients with anticoagulation had IC bleeds and those off anticoagulation had ischaemic stroke

**Table 11: Efficacy of anticoagulation on clot reduction in patients with MACCE**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | | Pre-op Vs TEE | | | Total | Chi-square | p-value |
| Decrease | Increase | No change |
| Anticoagulation | Yes | 3 | 0 | 2 | 5 | 1.440 | 0.487 |
| No | 2 | 1 | 1 | 4 |
| Total | | 5 | 1 | 3 | 9 |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | | Pre-op Vs OT | | Total | Chi-square | p-value |
| Decrease | No change |
| Anticoagulation | Yes | 3 | 2 | 5 | 0.090 | 0.764 |
| No | 2 | 2 | 4 |
| Total | | 5 | 4 | 9 |

**Table 12: Efficacy of anticoagulation on clot reduction in patients without MACCE**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | | Pre-op Vs TEE | | | Total | Chi-square | p-value |
| Decrease | Increase | No change |
| Anticoagulation | Yes | 40 | 0 | 6 | 46 | 41.307 | <0.001\* |
| No | 0 | 4 | 1 | 5 |
| Total | | 45 | 4 | 9 | 51 |

\*Statistically significant (p<0.05)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | | Pre-op Vs OT | | | Total | Chi-square | p-value |
| Decrease | Increase | No change |
| Anticoagulation | Yes | 41 | 1 | 4 | 46 | 27.440 | <0.001\* |
| No | 0 | 3 | 2 | 5 |
| Total | | 41 | 4 | 6 | 60 |

\*Statistically significant (p<0.05)

In our study patients with anticoagulation had more number of adverse effects at 1 year follow up showing statistical significance in MACCE at 1 year postop followup

**Table 13: relation of 1-year outcome and anticoagulation in patients <3 weeks and >3 weeks**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | | Duration of Anticoagulation (AC) | | | Total | Chi-square | p-value |
| </=3 weeks | >3 weeks | No AC |
| One year  outcome | Yes/ events | 2 | 5 | 4 | 11 | 5.008 | 0.082 |
| No MACCE | 9 | 35 | 5 | 49 |
| Total | | 11 | 40 | 9 | 60 |

**Table 14: relation of 1-year outcome and anticoagulation in patients on anticoagulation**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | | Anticoagulation | | Total | Chi-square | p-value |
| Yes | No |
| One year  outcome | Yes/ events | 7 | 4 | 11 | 4.822 | 0.028\* |
| No MACCE | 44 | 5 | 49 |
| Total | | 51 | 9 | 60 |

\*Statistically significant (p<0.05)

**Conclusion**

Atrial fibrillation is the most common cardiac arrhythmia and is associated with an increased risk of stroke and thromboembolic complications.

In our study 60 patients with LA clots on preop TTE were considered

Out of 60 patients 48 patients (80%) had a clot on TEE and 12 patients(20%) did not have a clot on TEE

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