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Peri-operative management and surgical challenges in triple valve surgery in a patients with history of MVR

ABAN 1394



Clinical feature

- ◆ A 57 yrs. Gentlemen
- ◆ Evaluated for recent DOE FC II
- ◆ Hx CMVC 1359
- ◆ Hx. MVR (Bjork Shiley 27) 1369
- ◆ Otherwise healthy
- ◆ BSA 1.66

TTE/ TEE

- ◆ **Normal functioning prosthesis ,**
- ◆ **TMVG: 5mmHg**
- ◆ **Sever AS, Sever AI**
- ◆ **AVA:1.3 ,AVPG 43, Annulus 21 Asc. 24mm**
- ◆ **Mod-Sever TR, TV annulus : 37 mm**
- ◆ **PAP: 45 mmHG**
- ◆ **LVEF 45% Mod. RV Dysfunction.**
- ◆ **LVEDD: 5.7cm, EDV:76 ml**
- ◆ **Large LA, Max Diameter : 6.9cm**

- ◆ ECG: A Fib.
- ◆ CXR: Cardiomegaly CTR= 65%
- ◆ NECA, right Dominant

Coronary angiography indications

| | | | |
|--|---|---|--|
| <ul style="list-style-type: none"> • history of coronary artery disease • suspected myocardial ischaemia • left ventricular systolic dysfunction • in men aged over 40 years and postmenopausal women • ≥ 1 cardiovascular risk factor. | I | C | |
| <p>Coronary angiography is recommended in the evaluation of secondary mitral regurgitation.</p> | I | C | |
| Indications for myocardial revascularization | | | |
| <p>CABG is recommended in patients with a</p> | I | C | |

Indications for Surgery

- ◆ Dominant AI/AS ?
- ◆ Significant TR ?
- ◆ Previous mono leaflet prosthesis in Mitral position ?
- ◆ AF surgery?

Table 7 – Indications for surgery in A-severe aortic regurgitation and B-aortic root disease (whatever the severity of aortic regurgitation).

| | Class | Level |
|---|-------|-------|
| A. Indications for surgery in severe aortic regurgitation | | |
| Surgery is indicated in symptomatic patients. | I | B |
| Surgery is indicated in asymptomatic patients with resting LVEF \leq 50%. | I | B |
| Surgery is indicated in patients undergoing CABG or surgery of ascending aorta, or on another valve. | I | C |
| Surgery should be considered in symptomatic patients with resting EF $>$ 50% with severe LV dilatation: LVEDD $>$ 70 mm, or LVESD $>$ 50 mm or LVESD $>$ 25 mm/m ² BSA. ³ | IIa | C |

Table 8 – Indications for aortic valve replacement (AVR) in aortic stenosis.

| | Class | Level |
|--|-------|-------|
| AVR is indicated in patients with severe AS and any symptoms related to AS. | I | B |
| AVR is indicated in patients with severe AS undergoing CABG, surgery of the ascending aorta or another valve. | I | C |
| AVR is indicated in asymptomatic patients with severe AS and systolic LV dysfunction (LVEF <50%) | I | C |
| AVR is indicated in asymptomatic patients with severe AS and abnormal exercise test showing symptoms on exercise clearly related to AS. | I | C |
| AVR should be considered in high risk patients with severe symptomatic AS who are suitable for TAVI, but in whom surgery is favoured by a 'heart team' based on the individual risk profile and anatomic suitability. | IIa | B |
| AVR should be considered in asymptomatic patients with severe AS and abnormal exercise test showing fall in blood pressure below baseline. | IIa | C |
| AVR should be considered in patients with moderate AS ³ undergoing CABG, surgery of the ascending aorta or another valve. | IIa | C |
| AVR should be considered in symptomatic patients with low flow, low gradient (<40 mmHg) AS with normal EF only after careful confirmation of severe AS. | IIa | C |
| AVR should be considered in symptomatic patients with severe AS, low flow, low gradient with reduced EF, and evidence of flow reserve. | IIa | C |
| AVR should be considered in asymptomatic patients, with normal EF and none of the above mentioned exercise test abnormalities, if the surgical risk is low, and one or more of the following findings is present: <ul style="list-style-type: none"> • Very severe AS defined by a peak transvalvular velocity >5.5 m/s or, • Severe valve calcification and a rate of peak transvalvular velocity progression ≥0.3 m/s per year. | IIa | C |
| AVR may be considered in symptomatic patients with severe AS, low flow, low gradient, and LV dysfunction without flow reserve. | IIb | C |
| AVR may be considered in asymptomatic patients with severe AS, normal EF and none of the above mentioned exercise test abnormalities, if surgical risk is low, and one or more of the following findings is present: <ul style="list-style-type: none"> • Markedly elevated natriuretic peptide levels confirmed by repeated measurements and without other explanations • Increase of mean pressure gradient with exercise by >20 mmHg • Excessive LV hypertrophy in the absence of hypertension. | IIb | C |

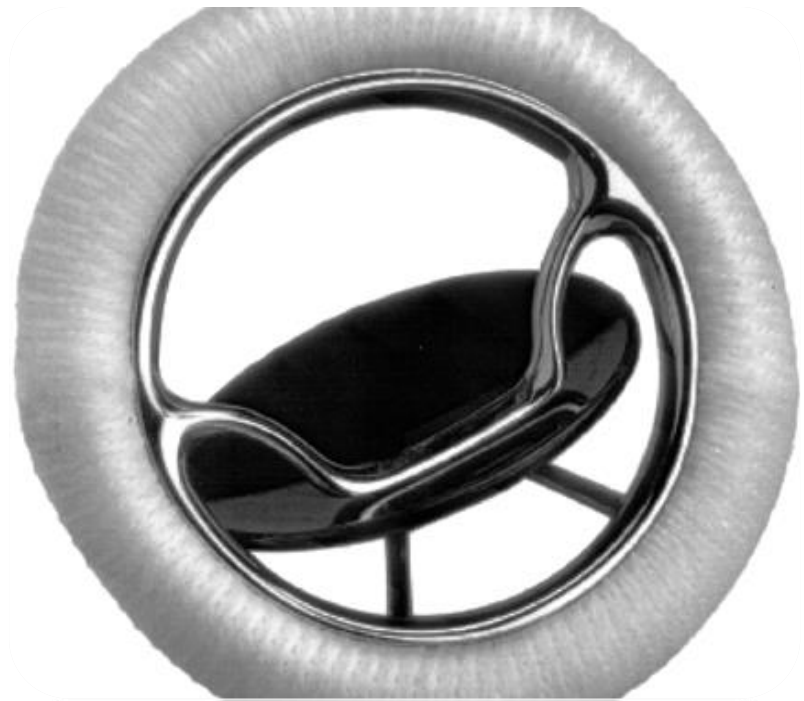
Table 15 – Indications for tricuspid valve surgery.

| | Class | Level |
|--|--------------|--------------|
| Surgery is indicated in symptomatic patients with severe TS. | I | C |
| Surgery is indicated in patients with severe TS undergoing left-sided valve intervention. | I | C |
| Surgery is indicated in patients with severe primary or secondary TR undergoing left-sided valve surgery. | I | C |
| Surgery is indicated in symptomatic patients with severe isolated primary TR without severe right ventricular dysfunction. | I | C |
| Surgery should be considered in patients with moderate primary TR undergoing left-sided valve surgery. | IIa | C |
| Surgery should be considered in patients with mild or moderate secondary TR with dilated annulus (≥ 40 mm or > 21 mm/m ²) undergoing left-sided valve surgery. | IIa | C |
| Surgery should be considered in asymptomatic or mildly symptomatic patients with severe isolated primary TR and progressive right ventricular dilatation or deterioration of right ventricular function. | IIa | C |
| After left-sided valve surgery, surgery should be considered in patients with severe TR who are symptomatic or have progressive right ventricular dilatation/dysfunction, in the absence of left-sided valve dysfunction, severe right or left ventricular dysfunction, and severe pulmonary vascular disease. | IIa | C |

TS: Tricuspid stenosis, BSA: body surface area, RV: right ventricle, TR: tricuspid regurgitation.

Previous tilting disc dilemma?

- Should the prosthetic mitral valve be replaced by new generation prosthesis?



LETTERS TO THE EDITOR

valves. He claims that the operative risk for elective replacement of these valves might be as high as 16% for mitral valves and 9% for aortic valves and argues that prophylactic replacement of these valves (making no distinction between CC60 and CC70 valves) "for fear alone is unjustifiable".

implanted worldwide.³ In this study it was found that a 29-33 mm diameter was the only risk factor for strut fracture in CC70 valves. There was no difference between aortic and mitral valves.

I believe that there is strong statistical support for prophylactic replacement of some of the large (29-33 mm) CC70 valves, whether in the aortic or the mitral position.

*Amended Guidelines To Assess Patients With
Bjork-Shiley Convexo-Concave Heart Valves
For Elective Explantation
Proposed by the Bowling-Pfizer Supervisory Panel
and
Adopted on March 8, 2000 by the
U.S. District Court, Southern District, Western Division
Cincinnati, Ohio*

| <u>Factor</u> | <u>Subgroup</u> | <u>Risk Multiplier</u> |
|-----------------------|------------------|------------------------|
| Constant ¹ | All | 0.097 |
| Size (mm) | 21 or 25 | 1.00 |
| | 23 or 27 | 3.03 |
| | 29 | 4.20 |
| | 31 | 6.01 |
| | 33 | 10.60 |
| Position | Aortic | 1.00 |
| | Mitral | 2.37 |
| Weld date | <1980, 7/82-3/84 | 1.00 |

Pre-op Evaluation

- ◆ Lab data?
- ◆ PFT?
- ◆ Dental procedure?
- ◆ Carotid Doppler?
- ◆ Risk stratification / Euroscore ?
- ◆ Chest CT?

3-D multidetector computed tomography in reoperative cardiac surgery

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CONCLUSION

Although no randomized prospective study has been performed to prove the role of preoperative MDCTA, it is obvious that new piece of information provided by MDCTA will give important clues to the surgeons regarding reoperative sternotomy. High risk findings may change surgeon's operative strategy and may even lead to a different operation or seek other procedures such as transcatheter aortic valve replacement. In conclusion, 3-D MDCTA provides important information in a high risk reoperative cardiac surgery and lowers the frequency of injury to vital structures.

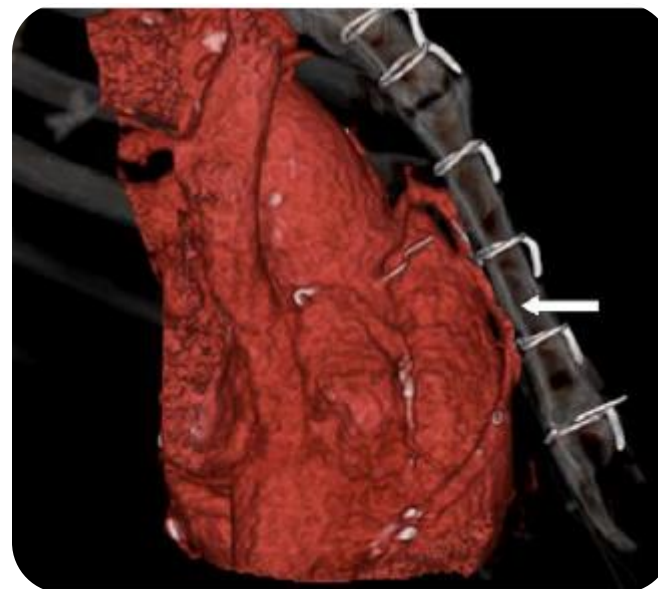


Table 16 – Choice of the aortic/mitral prosthesis in favour of a mechanical prosthesis.

| | Class | Level |
|---|-------|-------|
| A mechanical prosthesis is recommended according to the desire of the informed patient and if there are no contraindications for long-term anticoagulation. | I | C |
| A mechanical prosthesis is recommended in patients at risk of accelerated structural valve deterioration. | I | C |
| A mechanical prosthesis is recommended in patients already on anticoagulation as a result of having a mechanical prosthesis in another valve position. | I | C |
| A mechanical prosthesis should be considered in patients aged <60 years for prostheses in the aortic position and <65 years for prostheses in the mitral position. ^a | IIa | C |
| A mechanical prosthesis should be considered in patients with a reasonable life expectancy, for whom future redo valve surgery would be at high risk. | IIa | C |
| A mechanical prosthesis may be considered in patients already on long-term anticoagulation due to high risk of thromboembolism. | IIb | C |

^a In patients aged 60–65 years for aortic prosthesis and 65–70 years for mitral prosthesis both possibilities (mechanical or biological) are acceptable.

- ◆ Surgical approaches?
- ◆ Cannulation?
- ◆ Cardioplegic solution route?

Our strategy

- ◆ AVR 23 Slim-line Carbomedics
- ◆ TVr (ring annuloplasty) Sovering
- ◆ Paravalvular leakage repair using trans-septal approach

- ◆ Un-eventful CPB weaning with low dose epinephrine
- ◆ IOTEE:
 - Preserved LV function ,
 - Good prostheses function
 - No para no gradient
 - No TS, Mild TR

Hemodynamic instability after a while

- ◆ Dilated RV
- ◆ High PAP
- ◆ Increased TR severity
- ◆ Residual ASD flow
- ◆ Good prostheses function
- ◆ LV was OK



What happened?

What should we do?

Second run CPB

- ◆ **Check the tricuspid valve for suture disruption or ...**
- ◆ **Atrial septum reinforcement suture**
- ◆ **SVG to RCA**

- ◆ Sever RV dysfunction
- ◆ Sever PH
- ◆ BP= 80-85 with 0.15 micro/kg/min Epi.
- ◆ Good Blood gas
- ◆ Good ECG

◆ Clinical diagnosis:

RV MI?

Prosthesis mechanical dysfunction

Reverse prosthesis implantation

Persistent Pulmonary hypertension?

Next Step?!

Go on bypass and check the valves

IABP

IOTEE

ECMO

RVAD



IOTEE:

Unreliable valve function assessment due to low BP



- AO pressure : 80/50
- PAP: 85 mmHG
- Sever right heart congestion

Patient saving Plan?!

Third run CPB

- ◆ Replace the bjork- Shiley with a 27 mm St.jude
- ◆ CPB Weaning with low dose Epi.
- ◆ IOTEE

LVEF= 45%

Mild to Mod. RV dysfunction

Mild TR

Early antithrombotic management after valve replacement

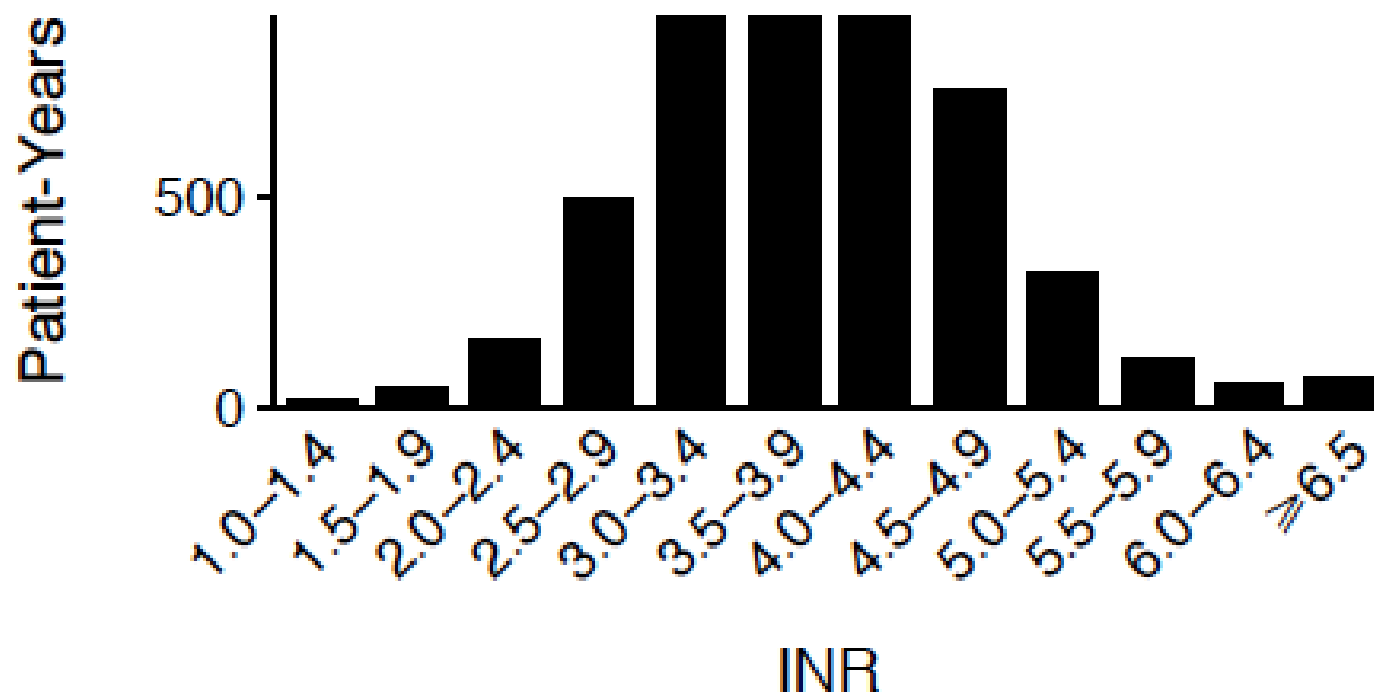
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| Feature of management | European Society of Cardiology ^[9] | British Society for Haematology ^[8] | American College of Cardiology/ American Heart Association ^[11] |
|-----------------------------|--|--|---|
| Type of heparin | UFH | UFH | UFH |
| Start of heparin | Heparin and coumarins on first postoperative day, or heparin on first postoperative and coumarins later | – | Controversial |
| Duration of heparin therapy | Until therapeutic INR is reached | Until INR is within the therapeutic range for more than 2 days | Controversial |
| Coumarin dosage | No recommendation for starting dose, because it depends on the indication, coagulative and clinical status, age and heart failure; oral anticoagulation should be initiated cautiously | 10 mg warfarin, unless elderly, congestive cardiac failure, liver disease, or weight less than average body weight | No recommendation for starting dose. INR level depends on valve type (bileaflet versus tilting disk) and position |
| Monitoring | UFH: aPTT (double aPTT) Coumarins: INR | UFH: aPTT Warfarin: INR | Warfarin: INR |

OPTIMAL ORAL ANTICOAGULANT THERAPY IN PATIENTS WITH MECHANICAL HEART VALVES

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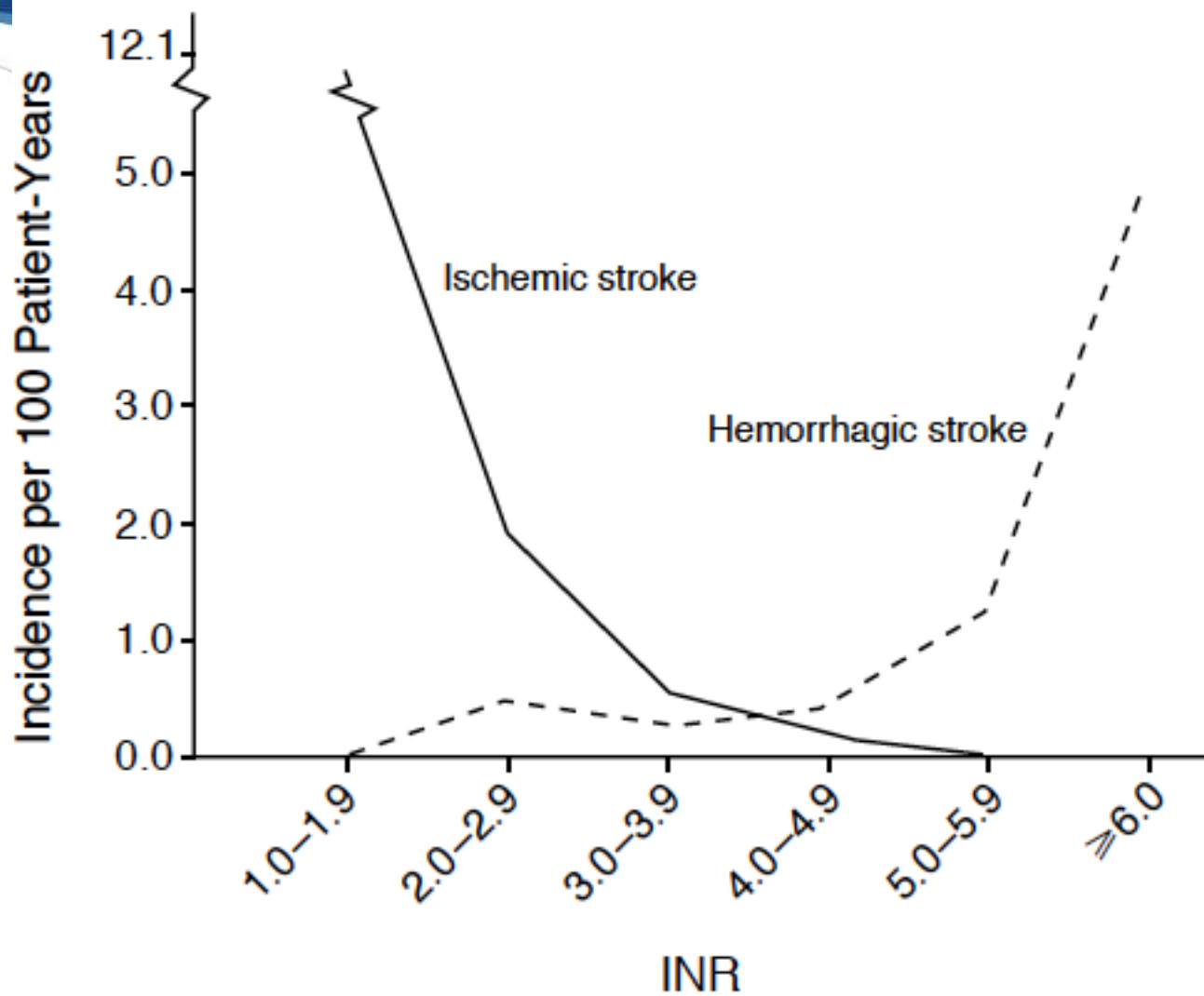
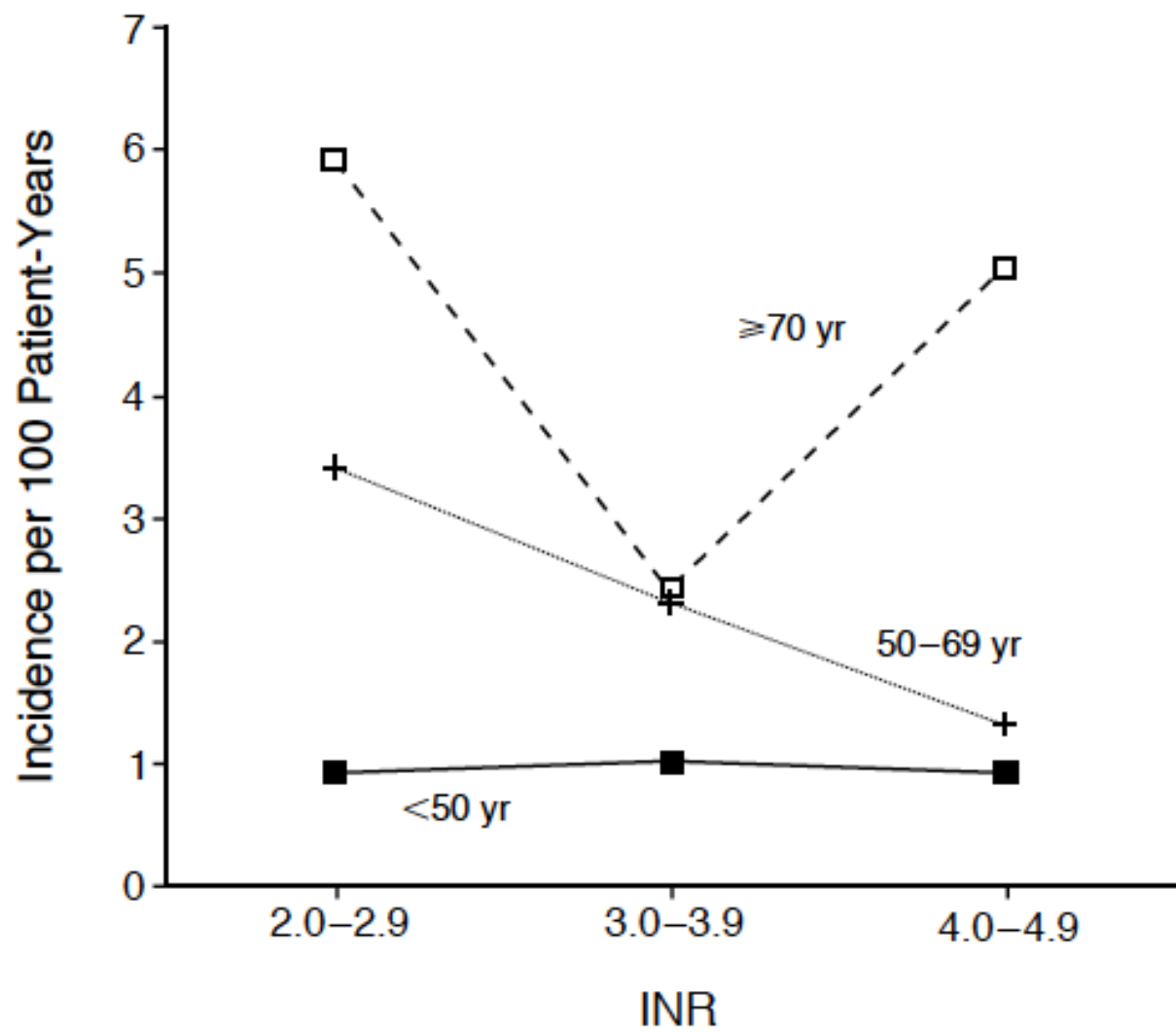
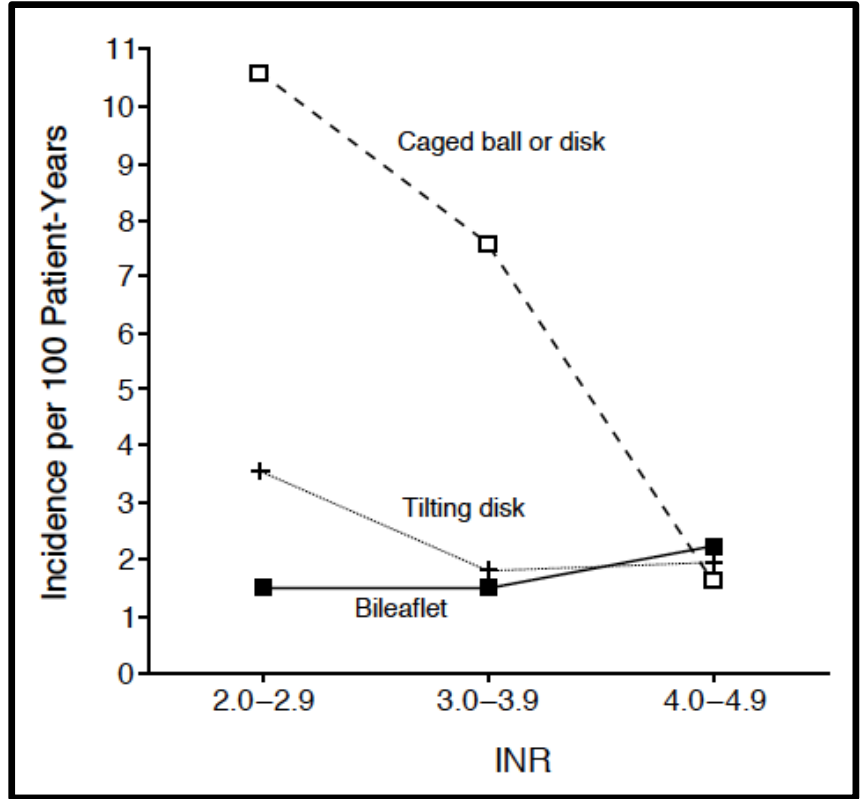
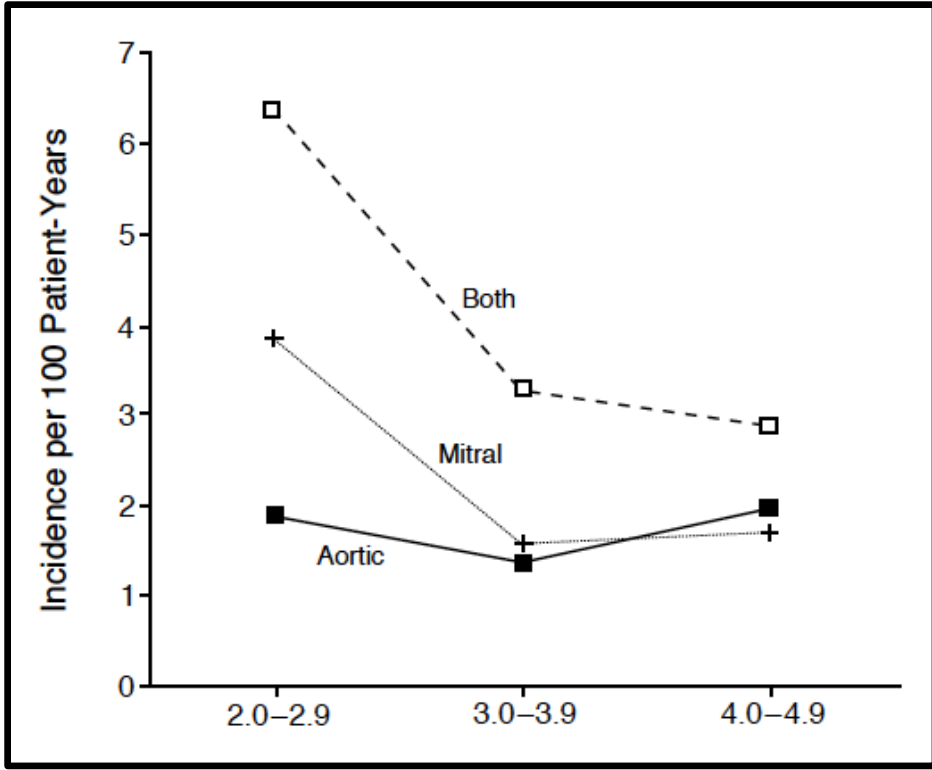


Figure 2. Incidence of Ischemic and Hemorrhagic Stroke According to INR Category.





Management of High INR



Bleeding complications of Warfarin





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