DILEMMAS IN MANAGEMENT OF PREGNANT PATIENTS WITH MECHANICAL PROSTHETIC VALVES IN RURAL AND SEMI-URBAN NORTH INDIAN POPULATION AT A TERTIARY CARE INSTITUTION.

Cardiology

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ABSTRACT

Pregnancy is a prothrombotic stage, and in women with mechanical heart valves, anticoagulation is a challenge to attain an optimal outcome in mother and fetus. The use of combinations coumadin derivatives and various heparins is still in inconclusive stage due to various socioeconomic and demographic situation. In developing countries due to the cost of surgery, and compliance with lifelong anticoagulation there is contradiction for efficient outcome. Hence a safe protocol is necessary for implementation. **Objectives:** To evaluate the most effective, practical and uniform "Anticoagulation Regimen" suited to rural and semi-urban Indian pregnant women with mechanical heart valves with low socio-economic status and to observe its impact on the pregnancy outcomes. **Methodology:** Retrospective observational cohort study carried out at tertiary institute, between July 2006 to June 2015. 69 women became pregnant during the period from 2006 to 2015 on 1 or multiple occasions. 21(30.43%) pregnancies ended in early abortions and 46 (66.7%) pregnancies were continued. Anticoagulation protocol that was followed in these women was H-A-H protocol. These pregnancies were managed by obstetric team of tertiary care hospital under same consultant. Outcome measures were analyzed. Data was expressed as mean with standard deviation or frequency with percentage as appropriate. **Results:** Of 292 women, who underwent valve replacement surgery, 69 pregnancies were reported during this period on 1 or multiple occasions. 46 women had successful deliveries and rest 23 had single or multiple pregnancy failure. Incidence of stillbirth in those who delivered successfully was lower (2.89%). Fetal morbidity was 37.68% and none of the pregnant women had valve thrombosis. In 46 women majority had successful outcome except 6 (13.04%) children out of 46 who developed anticoagulation related congenital defects. This was mainly seen in those women who presented late in pregnancy. **Conclusion:** Our Experience showed that Heparin-Acitrone-Heparin protocol is effective and safe in pregnancy than heparin alone, or acitrone alone regimen. The fetal outcome was good, maternal compliance was better and this protocol is widely recommended.

KEYWORDS

Pregnancy with Prosthetic valves, H-A-H protocol, anticoagulation, outcome

INTRODUCTION

Many young women in India suffer with valve disease and undergo replacement procedure both before and after marriage. Rheumatic heart valve disease continues to be widespread amongst rural and semi-urban north Indian population. Women residing in these parts of North India with mechanical heart valves on anticoagulants having pregnancy itself comes under a bracket of 'High Risk' and brings out a unique challenge in their management at tertiary centre despite the standard of maternal and cardiac care is systematic and easily available to all.

Despite improvements in general education girl child is still neither favored in pregnancy nor in sickness.

We have studied the effects of uniqueness this social problem and its impact of the pregnancy outcomes.

Clinical Methods and Material

Study Patients:

Retrospective observational cohort study carried out at tertiary institute, between July 2006 to June 2015. 69 women became pregnant during the period from 2006 to 2015 on 1 or multiple occasions. 21(30.43%) pregnancies ended in early abortions and 46 (66.7%) pregnancies were continued. Anticoagulation protocol that was followed in these women was H-A-H protocol. These pregnancies were managed by obstetric team of tertiary care hospital under same consultant. Outcome measures were analyzed. Data was expressed as mean with standard deviation or frequency with percentage as appropriate.

Management during Pregnancy:

Patients were managed jointly by the department of Cardiovascular and Thoracic Surgery and the department of Maternal and Reproductive Health (MRH) of the same hospital. These women when reported to either of the department were clinically examined and

detail history with pedigree was taken. Relevant investigations were done and routine fetal surveillance was done. They were counselled for HAH/AAH/LMWHAH protocol for anticoagulation with advantages and disadvantages and were put on the protocol they agreed.

HAH protocol which was mostly followed. Range of PT-INR/ APTT was kept around 2-3 in MVR, 1.5-2.5 in AVR and 2.5-3.5 in DVR. HAH protocol was as follows:

1st Trimester: Discontinue oral Nicoumalone completely and start on Unfractionated Heparin.

2nd and 3rd Trimester: Continue oral Nicoumalone (until week 36).

36th week onwards (Prior to delivery): Heparin only till delivery.

Post-Partum Period: Start anticoagulants along with Heparin, 6 hours after delivery.

RESULTS

Of 292 women, who underwent valve replacement surgery in a single unit of the tertiary care institute, 69 pregnancies were reported during this period on 1 or multiple occasions. Mean age was 32.45 years and mean weight was 45.78kg. Majority women had mitral valve repair (210, 71.91%), 59(20.21%) had DVR, and 23(7.87%) had AVR. 46 (66.7%) women had successful deliveries and rest 23(33.3%) had single or multiple pregnancy failure. (Table 1).

Table 1: demographic and operative details

Parameter	Value	Number	%
Age groups (n=46)	20-25 years	26	48.15
	26-30yrs	18	33.33
	31-35yrs	7	12.96
	36-40yrs	3	5.56
Mean age (n=292)		32.45 years	
mean weight(n=292)		45.78kg	
Parity(n=46)	Primae	19	35.18%

	Multipara	35	64.82%
Type of Surgery (n=292)	MVR	108	70.13%
	DVR	31	20.13%
	AR	15	9.74%
anticoagulation Protocol during pregnancy (n=46)	H-A-H	39	84.78%
	LMWH-A-H	2	4.34%
	A-A-H	5	10.87%

Stillbirth in those who delivered successfully was lower (2.89%) in incidence (Fig1).

Fig 1: Pregnancy outcome in women with valve replacement

19 (41.30%) women had LSCS and 25 (54.34%) had normal vaginal delivery. Fetal morbidity was 37.68% and none of the pregnant women had valve thrombosis. In 46 women majority had successful outcome except 6 (13.04%) children out of 46 who developed anticoagulation related congenital defects. This was mainly seen in those women who presented late in pregnancy

DISCUSSION

Pregnancy is a hypercoagulable state with a higher risk of thromboembolic complication during pregnancy. The clinical risk increases during this period. Maternal mortality reported in various studies ranges from 1 to 9%^(1,2,3)

Mechanical heart valves are inherently prone for increased thromboembolic events and acute hemodynamic problems due to mechanical dysfunction caused by valve thrombosis and pannus formation. Advanced heart disease associated with poor knowledge about pregnancy related issues, appropriate maternal care during pregnancy, malnutrition, increased pulmonary artery pressures, high incidence of right-sided valve and ventricular dysfunction along with chronic Atrial fibrillation also possess a greater challenge in these patients.

The problems associated in management of these patients are awareness, compliance, associated co-morbidities and complications associated with anticoagulation. This is associated with increased fetal wastage. In our series, the fetal wastage among women receiving anticoagulants was 37.68%, which was higher than the studies quoted. The increased risk of *warfarin embryopathy* when coumarin derivatives are used during the first trimester with continuing risk of central nervous system damage throughout pregnancy.^(4,7)

Heparin is safer for the fetus as it does not cross the placenta but carries a high risk of fetal loss from retro-placental hemorrhage as well as maternal bleeding complications. Heparin instead of warfarin has been recommended for use during the first trimester and after the 36th week but long-term heparin is not without any complications.⁽⁵⁻⁸⁾

Larrea et al reported a lower incidence of fetal complications in women receiving intravenous heparin in the first trimester and warfarin thereafter than in those taking warfarin throughout but at the expense of increased maternal mortality⁽⁹⁾ In our present series mild embryopathy occurred in 5 (13.95%) of the 43 successful pregnancies where as the incidence of embryopathy is lower with use of IV unfractionated heparin in the first 3 months (during 6th to 12th weeks of pregnancy)- Table-2.

Table 2: Review Of Literature On Outcome Of Pregnancies In Patients With Prosthetic Heart Valves

	Our Study	Oakley et al	Pawan Kumar et al	Larrea et al
Total pregnancy	69	62	47	47
Successful births	43(62.3%)	61(98.4%)	40(85.5%)	36(76.6%)
Abortions	21(30.43%)	1(1.6%)	7(14.9%)	11(23.4%)
Valve thrombosis	0%	4(6.5%)	2(4.2%)	3(7.9%)

Western studies reveal a good outcome of pregnancy in majority of women with prosthetic heart valves as compared to our series where abortion rates are more. This may be explained due to lack of pre-pregnancy counselling, poor nutrition, poor compliance, associated co morbidities and low socioeconomic status.

Heparin is neither effective nor safe for long-term use in pregnancy because of risk of both thromboembolism and bleeding with hazard to mother and fetus However the use of heparin during pregnancy does not result in a better outcome of pregnancy^(5,2)

In 135 published cases, one-eighth of the neonates were stillborn, one-fifth premature (a third of whom died) and apparently normal in two-thirds. The fetal outcome was slightly better in women taking the combination of heparin in the first trimester and warfarin thereafter and this scheme is widely recommended. Maternal thrombo-embolism is a problem. This is particularly important during pregnancy when the concentration of most coagulation factors in the blood is increased and fibrinolysis is decreased⁽¹⁰⁻¹²⁾

Satisfactory anticoagulation is mandatory. It is worth noting that in our series none of the women were observed with Valve thrombosis as improvement in one aspect occurs at the cost of the other.

Informed Consent: Verbal consent was obtained from all respondents to be included in study.

Conflicts of interest: The authors declare that they have no conflict of interest.

Financial disclosures: none.

Ethical statements: all procedures followed were in accordance with the ethical standards of responsible committee on human research (institutional and national) and with the Helsinki declaration of 1975, as revised in 2008.

Conclusion

Decision regarding anticoagulation in pregnancy requires intense counseling done at multiple sittings in terms of complete prospective follow-up to predict the efficacy and safety of any regime in pregnancy. The risk is associated with inadequate dosing and monitoring. Meticulous monitoring must be emphasized which Underscores the need to develop local innovative solutions for local problems in vast and varied country like India.

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