**Research Article**

**Heart Valve Surgery In Ethiopia: A private Hospital’s Experience**

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**Abstract**

**Background**– Open heart surgery services were introduced recently in Ethiopia. Elouzeir Cardiac Hospital is a private hospital in Addis Ababa which has started providing routine open heart surgery service. This study looks in to the results of the first hundred heart valve surgery outcomes of this hospital including whether routine use of postoperative inotropic support is necessary or not in heart valve surgeries.

**Methods –** A retrospective chart review of heart valve surgery cases operated from 20 June 2017 up to 19 June 2019 were included in the study. A structured questionnaire was used to extract data from the charts. The questionnaires were filled by a trained nurse of the hospital and analyzed by the principal investigator using SPSS 25 software.

**Results** – Of the total hundred valve operations done , sixty were females and forty males. Mean age was 35.83 years. Forty six percent were isolated Mitral stenosis cases. Eighty one percent were single valve cases and eleven percent were double valve cases. Mean intensive care unit stay was 5.79 days. Mortality rate including the first thirty days of postoperative follow up was eight percent. This is higher than excellent centers but is comparable to rheumatic valvular surgeries in other countries. Mitral stenosis was the commonest diagnosis which is expected as the commonest etiology of valve disease in Ethiopia is rheumatic. Sixty five percent of patients did not require postoperative inotropic support which indicates routine use is not necessary but this needs further wider scale study.

**Conclusion** – Mitral stenosis was the commonest valve lesion diagnosed and isolated mitral valve replacement was the commonest valve surgery performed in Elouzeir cardiac hospital. Routine use of inotropic support may not be needed for valve surgery patients.

**Keywords**  - Inotrope, mitral stenosis, rheumatic heart disease, valve replacement

**INTRODUCTION**

Ethiopia is a developing country with a current estimated population of more than 115,000,000 ([WWW.Worldmeters.info](http://WWW.Worldmeters.info)) and has a lot of chronic rheumatic valvular heart disease patients(1,2). This is not surprising as more than 80% of them are found in middle and low income countries(3). Many of these patients need open heart surgery services(4). Without surgery 1 to 5 % of patients with severe valve disease will die annually(3).

Modern open heart surgery in its current form started in the 1950s, however the situation in Africa is still challenging with a limited number of health facilities providing routine open heart surgery services(3,5,6 ). In Ethiopia open heart surgery on routine basis has been introduced recently(7). One such center is Elouzeir cardiac Hospital, a private cardiac hospital located at Addis Ababa, Bole sub city. The hospital provides interventional cardiology and open heart surgery services. This study reviews the first hundred heart valve surgeries of the hospital done starting from 20 June, 2017 to 19 June, 2019 .

Data of patients operated is analyzed to see the outcomes of heart valve surgery of the hospital as compared to the rest of the world. Another specific research question in this study is , do we need to use routinely inotropic support postoperatively in all heart valve surgery cases or in only selected cases? Routine use of inotropic support can cause a lot of side effects and higher cost whereas selective use might decrease these disadvantages(8). On the other hand, patients who undergo open heart surgery will have myocardial stunning which might cause low cardiac output state for which proper inotropic support will be mandatory.(10,11). Though there are several studies done that confirm routine use of inotropic support is not necessary in coronary artery bypass grafting surgery, there is only one study done on inotropic support after heart valve surgery according to a search we conducted of the English literature in various search engines(Pub med, Google scholar, Cochrane library).(9,10,12).

**METHODS**

The first 100 heart valve surgery patients operated in Elouzeir cardiac hospital were included in the study as recorded in the operation theatre registry . A retrospective chart review of the patient records were made after the patients charts were retrieved from the chart archive room. A structured questionnaire was used to extract the necessary information from the charts. The questionnaires were filed by a trained nurse of the hospital.

Demographic data including age, sex and address were included. Diagnosis as recorded from echocardiography done by the hospital’s cardiologist was recorded with significant regurgitation registered as 2+ or more whereas stenosis a significant gradient across the valve.

Data on length of Intensive care unit and ward stays, postoperative follow up of the first month after operation, type and size of valve, and whether inotropic support was needed or not were included in the questionnaire. The data were coded and put in to an SPSS version 25 analysis software and outcomes analyzed.

*Description of operative procedure*

The operative procedure was done under general anesthesia using total intravenous anesthesia and endotracheal intubation and routine arterial and central venous line monitoring and a Foley catheter to measure urine output. Median sternotomy , thymus dissection, opening of pericardial cavity with dissection of pericardium whenever there was adhesion and pericardial tenting were followed by full heparinization and determination of activated clotting time. Ascending aortic cannulation was done when activated clotting time was above 200 seconds. Bicaval cannulation was done for mitral and tricuspid surgeries whereas single double stage right atrial cannulation was used for isolated aortic valve surgeries. Once activating clotting time exceeded 380 seconds cardiopulmonary bypass was commenced. Cooling was done to 32 degrees . Aortic cross clamp was applied and aortic root ante grade cold crystalloid del Nido cardioplegia was given and half doses repeated in double valve replacement and Bentall cases. Ostial cardioplegias given in aortic regurgitation cases. No retrograde or warm cardioplegia (hot shot) used.

Mitral valve was approached through right atrium and interatrial septum only when tricuspid repair is needed otherwise it was approached directly by left atrial atriotomy between the right pulmonary veins in the interatrial groove. Superior and inferior vena cavae snuggers were used in those with right atrial approaches. The anterior mitral leaflet was excised and the posterior leaflet saved with it’s chordae .Mitral replacement was done using figure of eight non pledgeted Ticron 2/0 sutures and mechanical valves were used ; St. Jude and On-x valves.

Aortic surgeries were done through a transverse ascending aorta aortotomy, removal of the aortic cusps and any calcification and suturing using pledgeted Ticron 2/0 horizontal mattress sutures. Except one tissue valve used on the aorta for an old woman by her choice, all others were mechanical valves ; St. Jude and On-x valves.

Tricuspid valve repairs were commissurotomies for stenosis and De Vega annuloplasties for regurgitation as tricuspid annuloplasty rings were not available .

Aortic repairs were removal of sinus of valsalva calcifications causing isolated aortic stenosis in the presence of normal looking cusps.

Length of cross clamp time, arterial blood gas and electrolyte findings, temperature and electrocardiogram findings dictated the length of reperfusion time to wean off cardiopulmonary bypass and subsequent decannulations. Pacing wires were used when a rhythm disturbance appeared after release of aortic cross clamp, otherwise pacing wires were not placed routinely. Inotropic support was started if there were signs of hemodynamic compromise. Chest was closed after inserting two chest tubes using sternal wires; and soft tissue and subcuticular skin closures. Patients were transferred to the intensive care unit intubated.

*Ethical issues* **–** This study was conducted after the hospital medical director has given permission to access data of patients from the archive room, otherwise there was no formal institutional board review in this hospital. But as this was a retrospective study involving only chart reviews, there were no other ethical issues discussed.

**RESULTS**

Out of the100 cases, 40 were males and 60 females . The patients age ranged from 15 to 76 with a calculated mean of 35.83 years. More than half (52%) were from Addis Ababa. Nearly half(46%) of patients had isolated mitral stenosis while 18 had isolated aortic stenosis.(Fig 1)

81 were single valve replacements (60 mitral and 21 aortic) and 11 were double valve replacements. There were 3 mitral replacements with tricuspid repairs and 1 double valve replacement with tricuspid repair. There was one Bentall procedure.

There were three aortic stenosis cases due solely to calcium at the sinuses of valsalva with pliable normal looking cusps and removal of the calcifications resulted in relief of the stenosis and there was no need to replace the valves. This was proven later by absence of a gradient in the postoperative echocardiography.

Postoperative stay in the Intensive care unit was for a mean of 5.79 days. Sixty percent of patients did not need any inotropic or vasodilating agent.. An additional five percent needed nitroglycerin, a vasodilating agent. When inotropes were used, adrenaline and dobutamine were the commonest agents used.

Total cardiopulmonary bypass time ranged from 39 to 344 minutes (mean – 118) whereas aortic cross clamp time ranged from 23 to 260 minutes (mean – 83).

Thirty days mortality was 8%, 6 patients died in the intensive care unit, one patient died on the operating table due to failure to wean from cardiopulmonary bypass and 1 patient developed bleeding 17 days after discharge from the hospital and died immediately after readmission from massive gastrointestinal bleeding. The average aortic cross clamp time of the mortalities was 118 minutes while the cross clamp time average of the survivors was 83 minutes . The average cardiopulmonary bypass time of mortalities was 185 minutes while that of survivors was 118 minutes. Of the eight deaths, five were mitral valve replacements, one aortic valve replacement, one double valve replacement and one was the Bentall patient. Otherwise there was no stroke or any other complication recorded in the survivors in the first thirty days of postoperative follow up.

**DISCUSSION**

Though some patients from country side might have registered through their families in Addis Ababa, it is surprising that 52% of patients were from Addis Ababa because rheumatic heart disease is expected more in the regions with a lower socioeconomic standard than in Addis Ababa. The other factor could be economic, though a lot of patients are there in the regions, they may not afford the private hospital payment compared to Addis Ababa patients.

The fact that mitral stenosis was the commonest (46%) diagnosis is not surprising as the most common etiology of valve disease in Ethiopia is rheumatic(1,2). The same is true as to why most patients are young(mean of 35.83 years) and females(60%). This is in contrast to many developed nations where patients are older and degenerative causes are commonest indications for heart valve surgeries(13).However, in Brazil where rheumatic heart disease is common, the commonest valve replacement surgery was isolated aortic valve replacement(34%), followed by isolated mitral valve replacement(24.9%) whereas in this study isolated mitral replacement was commonest(60%) probably due to a different patient population(14).

Aortic stenosis due to sinus of valsalva calcifications in an otherwise normal looking aortic valve cusps was a unique observation in this study and deserves further studies(15).

The use of del Nido cardioplegia has been proven(16) by double blind studies already to be one of the best cardioplegic solutions. Besides, it is available widely as it is prepared locally(17).

Also, saving the posterior leaflet of mitral valve has been proven in several studies to be superior to removing both leaflets of the mitral valve in mitral valve replacement surgeries (18, 19).

Valve repair and use of a bioprosthetic in rheumatic valve disease is debatable especially in low and middle income countries where the chance of having a second surgery for deteriorated repaired valve or bioprosthesis is low. The fact that patients are young also adds to the logic behind using mechanical valves as these young patients have a longer life expectancy compared to older individuals. On the other hand, repair or use of bioprosthesis might make it easier to have children for women who wish to have children compared to those with a mechanical valve and long term anticoagulation especially in low and middle income countries where laboratory facilities for lifelong follow up of level of anticoagulation might be challenging. Availability of drugs used for anticoagulation might also be a challenge. Long term survival is similar in both repair and replacement.(20,21).

Among mechanical valves, the St. Jude valve is one of the time tested valves with excellent function (22), and were commonly used. When the St. Jude valves were not available, On-x valves were used.

The mean intensive care unit stay was 5.79 days which is longer than many other centers but our patients stayed longer in the intensive care because of lack of proper monitoring and close follow up in the wards(23).

Sixty five percent of our patients did not need inotropic support. This shows that like coronary artery bypass graft surgeries, Valve surgeries also may not require routine use of inotropic agents ; though this might require further wider scale studies(10). Among inotropic agents , levosimendan (which is not available in this country) has been shown to be the best agent in several studies followed by dobutamine and adrenaline (27).

Mortality is higher than many excellent centers (24) but is comparable to rheumatic valvular surgeries (25, 26) probably due to the late presentation of patients (26) and could also be due to lack of more advanced facilities like Extracorporeal membrane oxygenation and ventricular assist devices for patients who have a complicated course(10). Not surprisingly, those who died had a significantly longer cardiopulmonary bypass and aortic cross clamp times compared to the survivors. Whether the surgery was double or single valve replacement was not associated with mortality. A study done in Australia on surgery for rheumatic valvular heart disease has shown that adverse outcome in short term survival is associated with presence of associated kidney disease, length of intensive care unit stay and anticoagulant complication but was not associated with the left ventricular ejection fraction or whether the procedure was a double or a single valve(3). The length of Intensive care unit stay was not longer in the mortalities of our study as many patients died in the intensive care unit.

*The limitations of this study* includes a small study population, a retrospective study, a hospital based study especially of a private hospital which might not be representative of the whole population and therefore these limitations have to be taken in to account in interpreting the results and conclusions.

**DECLARATIONS**

**Acknowledgements**

I would like to thank Elouzeir Cardiac Hospital and it’s staff for all the contribution by providing the necessary charts and data. Ato Tenaw, deserves special mention for his diligence in filling the questionnaires.

**Author’s contributions ;** single author

**Availability of Data and Materials;** Data spread sheet available on Excel mode and file attached.

**Financial support and sponsorship** – None.

**Conflict of interest** : Author declared no conflict of interest.

**Ethical approval and consent to participate** *-* This study was conducted after the hospital medical director has given permission to access data of patients from the archive room, otherwise there was no formal institutional board review in this hospital. But as this was a retrospective study involving only chart reviews, there were no other ethical issues discussed.

**Consent for Publication** – Not applicable.

**REFERENCES**

1 - Kebede Oli, et al. Rheumatic heart disease in Ethiopia : Could it be more malignant?, Ethiopian Medical Journal , Feb 2004, 42(1):1-8 PMID: 15884271

2 - Dejuma Yadeta, Abrha Hailu, Abraham Haileamlak, Etsegenet Gedlu, Senbeta Guteta, Endale Tefera, et al. Prevalence of rheumatic heart disease among School Children in Ethiopia : A multisite echocardiography-based screening*, International journal of cardiology,* Oct 2016, 221: 260-263. https://doi.org/10.1016/j.ijcard.2016.06.232.

3 –E. Anne Russel, Lavinia Tran, Robert A. Baker, Jayme s. Bennetts, Alex Brown, Christopher M. Reid et al. A review of outcome following valve surgery for rheumatic heart disease in Australia*, BMC cardiovascular disorders*, Sep 2015, 15:103 –115. DOI: [10.1186/s12872-015-0094-1](https://www.researchgate.net/deref/https%3A%2F%2Fbmccardiovascdisord.biomedcentral.com%2Farticles%2F10.1186%2Fs12872-015-0094-1" \t "_blank)

4 – Charles M. Mvondo, Marta Pugliese, Alessandro Giamberti, David Chelo, Liliane M. Kuate, Jerome Boombhi, et al. Surgery for rheumatic mitral valve disease in Sub-Saharan African counties: Why valve repair is still the best surgical option*, Pan African Medical Journal*, Aug 2016, 24, 307:7504. DOI: [10.11604/pamj.2016.24.307.7504](http://doi.org/10.11604/pamj.2016.24.307.7504" \t "_blank)

5 - Alfred J. Kaltman, et al. Late complications of heart valve replacement*, Annual Reviews medical journal*,Feb 1971, 22:343-354.

DOI: 10.1146/annurev.me.22.020171.002015

6 - koffi Herve Yangni-Angate, et al. open heart surgery in Sub-Saharan Africa : challenges and promise, *Cardiovascular Diagnosis and Therapy*,oct,2016,6(suppl 1),S1-S4 DOI: [10.21037/cdt.2015.12.09](https://doi.org/10.21037/cdt.2015.12.09" \t "_blank)

7 - Chirstian J Leuner, Abraha Hailu Wondimagegn, et al. Cardiology services in Ethiopia, *European Heart Journal*, Aug2018, 39 (29) : 2699-2700. https://doi.org/10.1093/eurheartj/ehy373

8 – Micheal Gillies, Rinaldo Bellomo, Laurie Doolan, Brian Buxton et al. Bench-to-Bedside review: Inotropic drug therapy after adult cardiac surgery – a systematic literature review, *Critical Care* , Jan 2005, 9 (3) : 266 – 279. DOI: [10.1186/cc3024](https://www.researchgate.net/deref/http%3A%2F%2Fdx.doi.org%2F10.1186%2Fcc3024" \t "_blank)

9 – John F. Butterworth IV, Claudine Legault, Roger L. Royster, John W. Hammon et.al. Factors that predict the use of positive inotropic drug support after cardiac valve surgery*, Anesthesia and Analgesia*, Mar 1998, 86(3) : 461-467. Doi : 10.1213/00000539 – 199803000 - 00002

10 – Alexandre Mebazaa, Antonis A. pitsis, Alain Rudiger, Wolfgang Toller, Dan Longrois, Sven-Erik Ricksten, et al. Clinical review : Practical recommendations on the management of perioperative heart failure in cardiac surgery, *Critical care*, Apr 2010, 14 : 201 – 215. https://doi.org/10.1186/cc8153

11 – Julia Schumann, Eva C. Henrich, Hellen Strobl, Roland Prondzinsky, Sophie Weiche, Holger Thiele, et al. Inotropic agents and vasodilator strategies for the treatment of cardiogenic shock or low cardiac output syndrome*, Cochrane Database of systematic reviews*, Jan 2018 ,Issue 1. DOI: [10.1002/14651858.cd009669.pub3](https://www.researchgate.net/deref/http%3A%2F%2Fdx.doi.org%2F10.1002%2F14651858.cd009669.pub3" \t "_blank)

12 – Eric G. Butchart, Christa Gohlke-Barwolf, Manuel J. Antones, Pilar Tornos, Raffaele De Caterina, Bertrand Cormier, et al. Recommendations for the management of patients after heart valve surgery*, European Heart Journal*, Aug 2005, 26 : 2463 – 2471. https://doi.org/10.1093/eurheartj/ehi426

13 – Lucia Musumeci, Nicolas Jacques, Alexandre Hego, Alain Nchimi, Patrizio Lancelloti, Cecile Oury et al. Prosthetic heart valves: challenges and solutions*, Frontiers in cardiovascular medicine*, May 2018, 5(46) : 1 – 5. https://doi.org/10.3389/fcvm.2018.00046

14 – Alexandre C. Zilli, Solange Guizilini, Isadora S. Rocco, Jose Amalth do Espirito Santto, Otavio Berwanger, Renato Abdala Karam Kalil et al. Valve heart surgery in Brazil – the Bypass registry analysis, *Brazil Journal of cardiovascular surgery*, May 2020, 35(1):82 – 90.DOI : 10.21470/1678 -9741 -2019 -0408

15 – Renata Greco, Mirko Muretti, Xu Yu Jin, Mario Petrou, et al. Aortic valve repair techniques: an early UK experience*, Open Heart*, Nov 2019,6(2): 1 – 5. DOI: 10.1136/openhrt-2020-001429

16 – Niv ad, Sari D. Holmes, Paul S. Massimiano, Anthony J. Rongione, Lisa M. Fornaresio, David Fitzgerald, et al. The use of del Nido cardioplegia in adult cardiac surgery : A prospective randomized trial, *Journal of Thoracic and Cardiovascular Surgery*, Mar 2018, 155(3):1011 –1018. doi: 10.1016/j.jtcvs.2017.09.146

17 – Prashant Mishra, Ranjit B. Jadhar, Chandan Kumar Ray Mohapatra, Jayant Khandekar, Chaitanya Raut, Ganesh Kumar Ammannaya, et al. Comparison of del Nido cardioplegia and Sent Thomas Hospital solution – two types of cardioplegia in adult cardiac surgery*, Kardiochir Torakochirurgia Polish* ,Dec 2016, 13(4):295-299. DOI: [10.5114/kitp.2016.64867](https://www.researchgate.net/deref/http%3A%2F%2Fdx.doi.org%2F10.5114%2Fkitp.2016.64867" \t "_blank)

18 – Donald W. Miller, Douglas D. Johnson, Tom D.Ivey, et al. Does preservation of the posterior Chordae tendineae enhance survival during Mitral Valve replacement?, *The Annals of Thoracic surgery*, July 1979, 28(1): 22 – 27. https://doi.org/10.1016/S0003-4975(10)63386-3

19 - Tirone E.David, Robert J. Borns, C. Maria Bacchus, Maurice N. Druck, Richard D. Weisel, et al. Mitral valve replacement for mitral regurgitation with and without preservation of chordae tendineae, *Journal of Thoracic and Cardiovascular Surgery*, Nov 1984, 88(5):718 – 725. https://doi.org/10.1016/S0022-5223(19)35439-X

20 – E. Anne Russell, Warren F. Walsh, Christopher M. Reid, Lavinia Tran, Alex Brown, Jayme S. Bennetts, et al. Outcomes after mitral valve surgery for rheumatic heart disease, *Heart Asia*, Jun 2017, 9(2):1 – 7. (http://dx.doi.org/10.1136/ heartasia-2017-010916

21 – Ayse Cetinkaya, Julia Poggenpohl, Karin Bramlage, Stefan Hein, Mirko Doss, Peter Bramlage, et al. Long – term outcome after mitral valve replacement using biological versus mechanical valves, *Journal of Cardiothoracic Surgery*, Jun 2019, 14(120):1-8. doi/10.1016/S0735-1097(00)00834-2

22 – John M. Kratz, Fred A. Crawford, Robert M. Sade, Arthur J. Crumbley, Martha R. Stroud, et al. St. Jude prosthesis for aortic and mitral valve replacement: A ten year experience*,, The Annals of Thoracic surgery*, Sep 1993, 56(3):462- 468. https://doi.org/10.1016/0003-4975(93)90880-Q

23 – Ahmed Almashrafi, Hilal Alsabti, Mirdavron Mukaddirov, Baskaran Balan, Paul Aylin et al. Factors associated with prolonged length of stay following cardiac surgery in a major referral hospital in Oman : a retrospective observational study*, BMJ*, Jun 2016; 6(6) : 1- 7. doi:10.1136/bmjopen-2015- 010764

24 – John Chambers, Simon Ray, Bernard Prendergast, Tim Graham, Brian Campbell, Donna Greenhalgh, et al. Standards for heart valve surgery in a ‘Heart valve center of excellence’, *Open Heart,* Jul 2015, 2(1): 1 -5. https://doi.org/10.1093/eurheartj/ehx370

25 – Regina Maria de Aquino Xavier, Vitor Manual Pereira Azevendo, Paulo Herique Godoy, Am Migowski, Antonio Luiz Pinho Ribeiro, Rogerio Brant Martins Chaves et al. Medium-term outcomes of 78,808 patients after heart valve surgery in a middle-income country: A nationwide population-based study, *BMC cardiovascular Disorders*, Dec 2017, 17(1): 302 – 312. DOI: [10.1161/01.CIR.0000079169.15862.13](https://www.researchgate.net/deref/http%3A%2F%2Fdx.doi.org%2F10.1161%2F01.CIR.0000079169.15862.13" \t "_blank)

26 – John S. Chaffin, Willard M. Daggett, et al. Mitral Valve Replacement : A nine-year follow-up of risks and survivals*, The Annals of Thoracic surgery,* Apr 1979, 27(4): 312-319. https://doi.org/10.1016/S0003-4975(10)63305-X

27 – Johannes Menger, Maximilian Edlinger-Stanger, Martin Dworshak, Barbara Steinlechner,et al. Postoperative management of patients undergoing cardiac surgery in Austria*, The central European Journal of Medicine*, Oct 2018, 130:716 – 721. <https://doi.org/10.1007/s00508-018-1403-3>

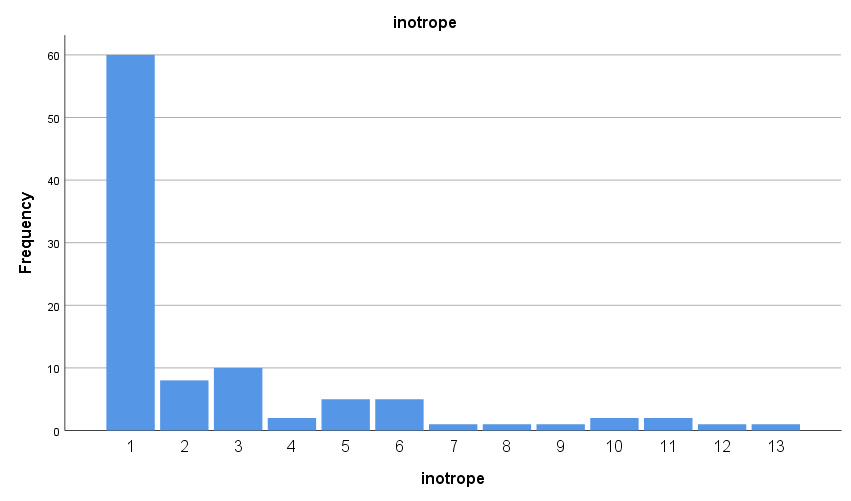
**Figure Legend**

**Figure 1** – Diagnosis of Heart Valve surgeries done at Elouzeir Hospital from June 20, 2017 to June 19, 2019.



1 – mitral stenosis 2 – mitral regurgitation 3 – Aortic stenosis 4 – Aortic regurgitation 5 – mitral stenosis and aortic regurgitation 6 – mitral and aortic stenosis 7 – mitral, aortic and tricuspid regurgitation 8 – mitral stenosis and regurgitation 9 - mitral stenosis plus tricuspid regurgitation 10 – mitral and tricuspid regurgitation 11 – mitral and tricuspid stenosis 12 – aortic stenosis and regurgitation 13 – mitral and aortic regurgitation

**Figure 2** - Inotrope use in heart valve surgeries done at Elouzeir Cardiac Hospital from June 20, 2017 to June 19, 2019



1 – no inotrope used 8 – Nitroglycerin and Noradrenalin

2 – Dobutamine used 9 – Nitroglycerin and dopamine

3 – Adrenaline used 10 - Dopamine

4 – Noradrenalin used 11 – Dobutamine, adrenaline and dopamine

5 – Nitroglycerine used 12 – Adrenaline, Noradrenalin, and dopamine

6 – Dobutamine and adrenaline 13 – Adrenaline and Noradrenalin

7 – Dobutamine plus Noradrenalin