

# DocConnect

Professional Writings by Medical Practitioners, Max Super Speciality Hospital, Saket

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## Robotic Urological Surgery: 15 years journey



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### INTRODUCTION

The intention of surgical specialities has been that patients who undergo surgery have a pleasant experience without compromising perioperative and postoperative outcomes. In all medical and surgical specialities, including urology, progress has optimised the diagnosis and treatment of diseases that may arise.

Minimally Invasive Surgery (laparoscopy) brought important and significant benefits such as improved visualisation, less pain, decrease blood loss, and it is aesthetically superior to open surgery. However, limitations were also identified: a steep learning curve, surgical fatigue (ergonomics), and prolonged surgical time because of the difficulty of the technique; these limitations did not allow the globalisation of this technique, and many preferred to continue with open surgery. Robotic surgeries has brought solution to these drawbacks and play its role in execution of surgical step.<sup>1</sup> Actually, robot has exceeded the human abilities in certain aspects like greater degrees of freedom in movement.

### History of Robotic Surgery

#### Yesterday dreams and early beginnings!

The word "robot" is from the Czech word "robota" which means forced labour. The modern history of robotic surgery begins with the Puma 560, a robot used by Kwoh et al. to perform neurosurgical biopsies with greater precision. Integrated Surgical Supplies Ltd. (Sacramento, USA) constructed two models with similar features: Probot,

a robot designed specifically for transurethral prostatectomy, and Robodoc, a robotic system for emptying the femur with more precision in hip replacement operations. The latter system was converted into the first robot approved by the FDA.

As robots developed in the medical field, researchers at the NASA (National Air and Space Administration) Ames Research Center joined the Stanford Research Institute for working on a robotic telemanipulator (SRA) to develop a system for hand surgery. With this the concept "telesurgery" was born which combined virtual reality, robots, and medicine.

Around the same time, Yulun Wang designed a robotic arm to hold a laparoscopic camera. His company, Computer Motion, commercialised the AESOP, an automatic endoscopic system for optimal positioning. Then ZEUS system, another type of modern robot launched in 1998, introduced the concept of telerobotics or telepresence robotic surgery. Jacques Marescaux used this robot in September 2001 to perform the first transatlantic remote laparoscopic cholecystectomy. While sitting in New York he operated on a patient in Strasbourg, France. This was a major landmark for surgery. The main drawback of the ZEUS system is the large size of robotic arms, which limits the space in the operating room and collisions between the trocars are frequent.

The license for telepresence surgical systems was acquired by Frederic H. Moll, who created the company Integrated Surgical Systems (now Intuitive Surgery, Inc.). He redesigned the telepresence surgery system and created the da Vinci Surgical System, classified as a master-slave surgical system. The da Vinci surgical robotic system is the most comprehensive system developed to date. It uses true 3D visualization and EndoWrist. FDA approved it in July 2000 for general laparoscopic surgery and in November 2002 for mitral valve repair surgery.<sup>2</sup>

## UROLOGY IN THE AGE OF INFORMATICS MINIMAL INVASION

The field of urology has been characterized by the innovation and accomplishment of different surgical techniques that have optimized the treatment of patients with genitourinary tract pathology.

Laparoscopy was the door to minimal invasion in urology. It started in 1991 by Dr. Clayman with the first laparoscopic radical nephrectomy.<sup>3</sup>

In 2000, when robotic technology was first introduced to urology, its advantages were readily recognized such as three-dimensional vision, the use of instruments that move with greater degrees of freedom compared to conventional laparoscopy. It also eliminates the tremor of the hand movements, so we can achieve a more precise intervention.<sup>4</sup>

While the patient is under anesthesia, four robotic arms and a video camera are inserted through small skin incisions. Surgeon performs minimally invasive surgery while seated in front of a computer console providing a 3D video screen and controls with which to manipulate the robotic arms.

Surgeon is master who performs the surgery. Robot is a perfect slave who follows all orders and movements of surgeon in a very precise manner. So, surgery is performed by surgeon and not the robot.

In spite of the growth in robotic surgery in almost all the surgical areas, it has been the urology field where it has caused main impact, with vast expansion and excellent results in different types of interventions: Simple Prostatectomy, Radical Prostatectomy, Partial Nephrectomy, Live Donor Nephrectomy, Pyeloplasty, Kidney

Transplantation, Ureteral Reconstruction, Ureteral Reimplantation, Radical Nephrectomy, Radical Cystectomy, Partial Cystectomy, Bladder Reconstruction, Retroperitoneal Surgery for Cancer, Bladder Diverticulectomy, Procedures for Incontinence (like Sacrocolpopexy) and Retroperitoneal Lymphnode Dissection.

The first robotic radical prostatectomy was performed by Binder and Kramer in Germany, while Abbou et al., in France, were the first ones in publishing it in the literature.<sup>5</sup> The group of Guillonnet et al. reported the first nephrectomy<sup>6</sup> and robotic lymphadenectomy as a treatment for prostate cancer.<sup>7</sup>

It is noteworthy that experience in robotic surgery has shown that until today surgical skills remains the most important determining factor for the final outcomes of the procedure.<sup>8</sup> If the surgeon has performed more cases and becomes more familiar with workspace, and better identifies the landmarks, he makes fewer mistakes which in turn in results in better outcomes.

## ROBOT IS NOT FUTURE ANYMORE, CURRENT APPLICATION

Since the first publication of a series of patients undergoing robot-assisted radical prostatectomy in 2001, the field has seen a dramatic increase in the use of robotic surgery for urologic procedures. The minimally invasive nature of these procedures allows better precision, decreased blood loss, decreased morbidity, and shorter hospital stay and convalescence while preserving functional and oncologic outcomes. Additionally, the application of robotic surgery has spread beyond radical prostatectomy to include Radical Cystectomy, Nephrectomy, Partial Nephrectomy, Adrenalectomy, and other Urological Procedures like Pyeloplasty, Ureteral Reimplantation, etc. Robotic surgery has even seen dramatic growth in pediatric urologic applications.

## LEARNING CURVE IN ROBOTIC SURGERY

Robotic surgery has not only changed the way we do surgery, it has revolutionized the way we teach and learn to operate. It has become part of the surgery training programs, and has been used for teaching surgery and to practice with three-dimensional virtual models instead of patients. The exponential growth in robotic technology has resulted in an ever-growing requirement for surgeons trained in robotic urologic surgery.

## HOW TO DEFINE THE LEARNING CURVE AND HOW LONG DOES IT TAKE?

The learning curve is originally an aeronautical term to characterize the diminishing amount of time required to perform a repeated task. Today, it describes a self-declared point at which a surgeon reaches a comfort zone when performing a procedure that guarantees effectiveness and safe outcomes. This period or number of cases is variable and difficult to establish. It depends on the surgeon's preset benchmarks, previous experience in laparoscopy or open procedures, and personal skills. Performing a greater number of cases will decrease surgical times, complication rates or conversion, and improve functional outcomes.

## VIRTUAL AND GUIDED ROBOTIC SURGERY TRAINING

A robotic surgeon in training learns surgery through the classic way of "supervised trial and error". The da Vinci SI Surgical System offers a dual console used for both training and collaboration. When the dual console is used for training, control over instruments can be easily and quickly exchanged during surgery - meaning the

teaching/ mentoring surgeon can hand over control of the instruments to the resident / fellow at any time. This enables a see-and-repeat model of instruction designed to accelerate the learning curve.

Studies conducted with residents and medical students show that suturing, and intracorporeal knotting are 65% faster with the robot compared to laparoscopy. The three dimensional view allows us to increase the speed by 30%. The ideal situation would be if the surgeon had a mixture of robotic and laparoscopic training.<sup>9-12</sup>

## ROBOTIC PROSTATECTOMY: A VIVID MODEL OF ROBOTIC SUCCESS

One of the techniques that have largely evolved after introduction of robot in urological practice is radical prostatectomy. This occurred for two main reasons: Firstly, early diagnosis and surgery may cure the disease in one hand, and prostate cancer has been more frequently diagnosed in its early stages on the other hand. The second reason is the high technical demands of the procedure; the work area is best approached by the robotically which gives better exposure and greater ranges of motion.<sup>12</sup>

In less than a decade, the Robot-Assisted Radical Prostatectomy (RARP) became the most frequently used surgical technique for treating prostate cancer. Today more than 85% of the radical prostatectomies in USA are performed robotically due to the enthusiasm of the surgeons, the interest of the patients, and effective trade promotion campaigns.

As far as the main objective of the procedure is concerned which is cancer control, robotic prostatectomy provided answers to people who looked at robotic prostatectomy with skepticism and showed that biochemical recurrence free survival is comparable to open prostatectomy at two and five years.<sup>13,14</sup>

The positive surgical margin rates, which are indicators of oncological safety, were found to be similar or even slightly lower in robotic surgery compared to open surgery. This was demonstrated by Dr. Smith who showed in his comparative study that RARP resulted in significantly lower PSM rates compared to open approach (15% vs. 35%).<sup>15</sup> Perioperative outcomes are other important aspects to assess where robot resulted in better results compared to open surgery. There was significant decrease in estimated blood loss, complication rates (robotic 6.6% vs. open 10.3%) and length of stay.<sup>16,17</sup>

Using prospective, validated quality of life instruments, the patients undergoing RARP were found to have higher scores and faster return to their base line functions when compared with patients undergoing open prostatectomy.<sup>18</sup> The so far obtained results for potency and continence have been similar when both groups were compared.<sup>16,17</sup>

## OTHER UROLOGICAL PROCEDURES

Regarding procedures on upper tract, robotic pyeloplasty demonstrated operative times comparable to laparoscopic pyeloplasty but with lower complication rates, faster recovery, and shorter hospital stay. It is emphasised that robotic partial nephrectomy appears to have shorter operative time (193 vs. 152 min), shorter ischemia time (18.0 vs. 14.1 min) and less blood loss (245 vs. 122 ml) compared with laparoscopic partial nephrectomy,<sup>19</sup> but when compared to open surgery, it showed decreased ischemia time, blood loss and length of stay only,<sup>20</sup> whereas total operative time was longer.

## CONCLUSION

Urologists have always been at the forefront of new developments and have changed the face of open surgery by accepting ever-changing improvements and technological advances. Robotic-Assisted Laparoscopic Urologic Surgery is a major evolution in the field and has now become a major subspecialty. Robotic-assisted laparoscopic urologic surgery was first performed in 2000, and the last 15 years have been testimony to its exponential growth and overwhelming adoption by surgeons and patients across the world.

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# Robotic surgery is the latest in advanced onco surgical procedures



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**R**obotic Surgery, or Robot-assisted Surgery, allows doctors to perform many types of complex procedures with more precision, flexibility and control than is possible with conventional techniques. Robotic Surgery is usually associated with minimally invasive surgery — procedures performed through tiny incisions. Introduction of robotic systems will even make complex procedures in Thoracic, GI and Gynaecology easier.

Due to small incisions, less trauma to the body and greater surgeon precision, robotic surgery provides the following benefits over traditional open procedures including: shorter hospital stay, less blood loss and less pain.

During surgery, three or four robotic arms are inserted into the patient through small incisions in the abdomen. One arm is a camera, two act as the surgeon's hands and a fourth arm may be used to move obstructions out of the way. Patients are surrounded by a complete surgical team, while the surgeon is seated at a nearby console. The surgeon uses a view finder which provides a three dimensional image of the surgical field, and the surgeon's hands are placed in special devices that direct the instruments. The robotic arms filter out any tremors in the physician's hands and increases the physician's range of motion. This enhanced precision is especially helpful to the surgeon during especially delicate portions of procedures.

## BENEFITS OF ROBOTIC SURGERY

Robotic surgery offers many benefits to patients compared to open surgery, including:

- Shorter hospitalisation
- Reduced pain and discomfort
- Faster recovery time and return to normal activities
- Smaller incisions, resulting in reduced risk of infection
- Reduced blood loss and transfusions
- Minimal scarring

## ADVANTAGES

Major advantages for surgeons using robotic surgery include:

- Greater visualisation
- Enhanced dexterity
- Greater precision

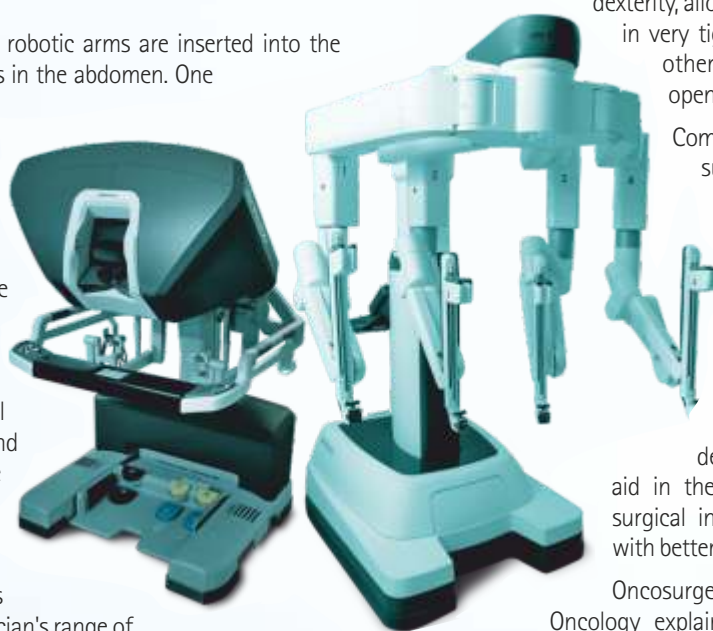
Robotic surgery is an advanced form of minimally invasive or laparoscopic (small incision) surgery where surgeons use a computer-controlled robot to assist them in certain surgical procedures. The robot's 'hands' have a high degree of dexterity, allowing surgeons the ability to operate in very tight spaces in the body that would otherwise only be accessible through open (long incision) surgery.

Compared to open surgery (traditional surgery with incisions), robotic and minimally invasive surgery results in smaller incisions resulting in less pain and scarring.

Robotic surgery allows surgeons to perform complex surgical tasks through tiny incisions using robotic technology. Surgical robots are self-powered, computer-controlled devices that can be programmed to aid in the positioning and manipulation of surgical instruments. This provides surgeons with better accuracy, flexibility and control.

Oncosurgery Specialist at Max Institute of Oncology explains that when performing robotic surgery using the da Vinci Surgical System:

- The surgeon works from a computer console in the operating room, controlling miniaturised instruments mounted on three robotic arms to make tiny incisions in the patient.
- The surgeon looks through a 3-D camera attached to a fourth robotic arm, which magnifies the surgical site.
- The surgeon's hand, wrist and finger movements are transmitted through the computer console to the instruments attached to the robot's arms. The mimicked movements have the same range of motion as the surgeon allowing maximum control.
- The surgical team supervises the robot at the patient's bedside.



# Percutaneous balloon aortic valvuloplasty & balloon dilatation of aortic coarctation in a 10 year old child



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**B**icuspid Aortic Valve (BAV) and Coarctation (Coarct) are two villainous cardiovascular lesions with a similar pathophysiology that is part of a diffuse arteriopathy. Neither can be considered a benign lesion. Several questions regarding their treatment strategies, however, remain unanswered. When both coarctation and aortic valve disease coexist, novel surgical treatment strategies may be necessary. In the presurgical era, dissection of the aorta caused death in 19% of cases of coarct but 50% when coarct coexisted with a bicuspid aortic valve.<sup>(1)</sup> Thus in co-existing lesion it becomes imperative to evaluate and treat both the lesions simultaneously. We discuss the methodology of treating such a case simultaneously, hitherto undescribed in the literature.

## CASE HISTORY

We report a case of 10 years old girl who presented to us with history of 2 episodes of syncopal attacks in the last 6 months. On clinical examination, Blood Pressure (BP) in the right (Rt) upper limb was 146/82, Rt lower limb 100/68mmHg. Echocardiography showed bicuspid aortic valve with severe AS (Mean PG-87mmHg) with severe discrete juxtaductal coarctation of Aorta. Aortic annulus 12 mm and transverse arch of 10mm. Also descending aorta at the level of diaphragm was 10mm. Pressure Gradient (grdt) across Coarct segment was 30mmHg with pan-diastolic spill. Left Ventricular (LV) ejection fraction was 30%. Right Subclavian Artery was aberrant in origin. On Cardiac Catheterisation LV Systolic pressure was 245mmHg, Systolic BP in Ascending aorta 140mmHg, in descending aorta 108mmHg. Balloon dilatation of Aortic valve & Coarct segment was done in the same sitting. Balloon aortic valvotomy (BAV) was done with Tyshak 2 balloons sequentially with 10mm x 4cm & 11mm x 4cm. Balloon dilatation of Coarctation segment was done with Tyshak 2 balloon 12mmx4cm in size. Post ballooning there was no significant gdt. across the coarct segment. Mean gdt across Aortic valve was 35mm Hg with normal LV ejection fraction.

## DISCUSSION

In the combination of the lesions as was present in our case the initial question arises as to which pathology – coarct or aortic stenosis should be addressed first. We believe when there is significant aortic stenosis in association with the coarctation, it is preferable to address the aortic stenosis first. In the presence of the combined lesions, perfusion of the coronary and cerebral circulations is dependent, at least partially, on the increased afterload in the ascending aortic pressure provided by the coarctation. Removing this afterload before opening the aortic valve could compromise the coronary and cerebral circulations even further. In addition, if the coarctation is dilated first, all of the manipulations required for crossing the aortic valve, and the aortic valve dilation,

will have to be through the freshly dilated coarctation site with the potential for traumatising the already damaged aortic intima in the coarctation site even further.

With combined aortic stenosis and coarctation, the diameters of the aortic valve annulus and the coarctation with the appropriate adjacent aortic diameters are measured from a left ventricular angiogram or an aortic root injection before an attempt is made to pass a catheter across the stenotic valve. A left ventricular angiogram can be obtained with injection through a prograde left ventricular catheter, while the aortic root injection is obtained with the retrograde multipurpose or angiographic catheter that has been manipulated past the coarctation and around the arch to the aortic root. In our patient we did everything through retrograde approach. Once the valve and coarctation measurements are obtained, the appropriate dilation balloon for the aortic valve dilation is prepared using the "minimal prep" technique but with a prolonged attempt at removing all air. No attempt is made to cross the aortic valve until the balloon for the dilation is prepared and ready for introduction.

To cross these valves, a very floppy tipped, exchange length, torque-controlled, guide wire is advanced through a multipurpose or right coronary catheter which is already positioned in the aortic root. The wire is advanced out of the catheter and multiple, rapidly repeated, short probes are made toward the aortic valve area with the very soft wire tip. The tip of the wire is redirected within the aortic root by simultaneously rotating the catheter (to change the anterior to posterior direction) and moving the catheter to and fro (to change the right to left side angle). Once the wire crosses the valve, it is advanced as far as possible into the ventricle, looping the soft tip within the left ventricle apex. With the wire passed as far as possible into the ventricle, the catheter is advanced over the wire into the ventricle. The wire is fixed in the ventricle and the catheter is immediately removed and replaced rapidly over the wire with the previously prepared balloon dilation catheter. The dilation of the valve is carried out with as rapid an inflation and deflation as possible. After the inflation/deflation, the balloon is immediately withdrawn out of the valve over the wire into at least the ascending aorta.<sup>(4)</sup>

The return of a good heart rate and a good, but lower, left ventricular pressure are immediate indications of the success of the dilation. Ideally, there will be a lower left ventricular pressure, but in the presence of the associated coarctation, the gradient may be "moved downstream" to the coarctation site with little lowering of the left ventricular pressure. The balloon is withdrawn back to the area of the coarctation. If the diameter of this balloon is smaller, or, at least, no more than a millimeter larger, than the measurement of the smallest diameter of the aorta adjacent to the coarctation, the coarctation site is dilated with the same balloon. If the balloon is two or more millimeters larger than the adjacent aorta in the area of

the coarctation, the balloon is replaced with an appropriate diameter balloon and the coarctation dilated. After both the aortic valve and the coarctation have been dilated the balloon is removed and replaced with a catheter to re-evaluate the hemodynamics. If the net left ventricular to femoral artery gradient is low, it is assumed that both procedures were successful and the procedure can be concluded.

An end-hole catheter is passed over the wire to the left ventricle and the retrograde wire removed. Pressures are recorded on withdrawal of the retrograde catheter from the left ventricle, to the aorta and across the coarctation site to quantitate the residual gradients at each are.<sup>(5)</sup>

## CONCLUSION

The CoA with severe AS in children is a challenging subset to manage. During childhood, insertion of a prosthetic valve is suboptimal because of the continuing growth of the child. Valvuloplasty is the interventional strategy of choice in children and in some young adults with BAV and aortic stenosis.<sup>(6)</sup>

Different methods are employed for the treatment of the CoA in children, including surgical or percutaneous balloon angioplasty

with or without stent placement. Today, transcatheter approaches have been increasingly utilized, because of improved balloon and stent technology, which confers improved safety and success of these procedures. Percutaneous techniques are promising for management of coarctation and severe AS in children.

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# Role of CT/MR imaging and echocardiography in evaluation of valsalva sinus aneurysm



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## INTRODUCTION

Valsalva sinus aneurysms are rare and can be either congenital or acquired. Congenital aneurysms may result from localized weakness of the elastic lamina or an underlying deficiency of normal elastic tissue. Acquired aneurysms commonly are caused by infectious diseases such as bacterial endocarditis, syphilis, and tuberculosis; degenerative conditions such as atherosclerosis and cystic medial necrosis; and injury from deceleration trauma

## HISTORY AND BACKGROUND

Patient is 49 years old male post RCA stenting, known hypertensive and now he came with complaints of chest discomfort, dyspnea

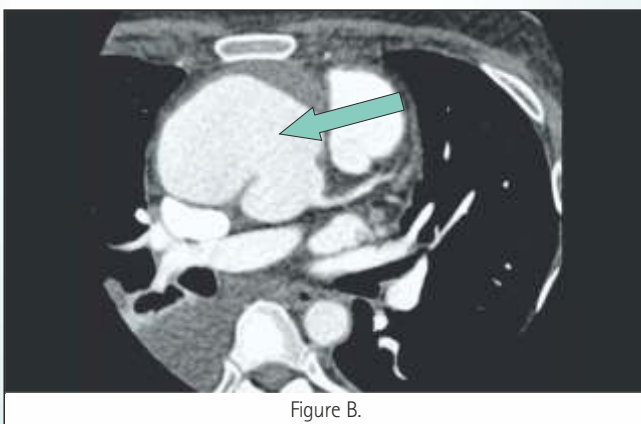
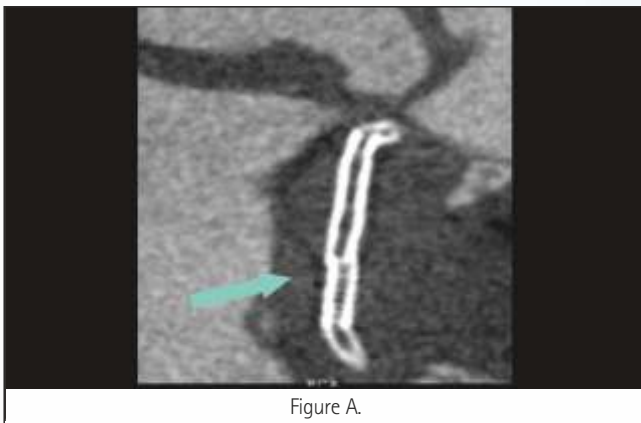
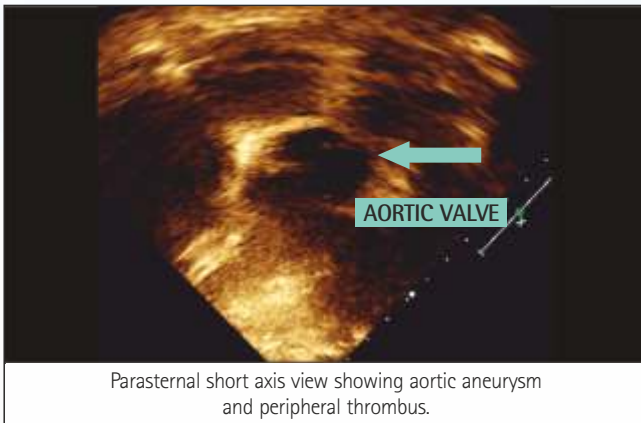
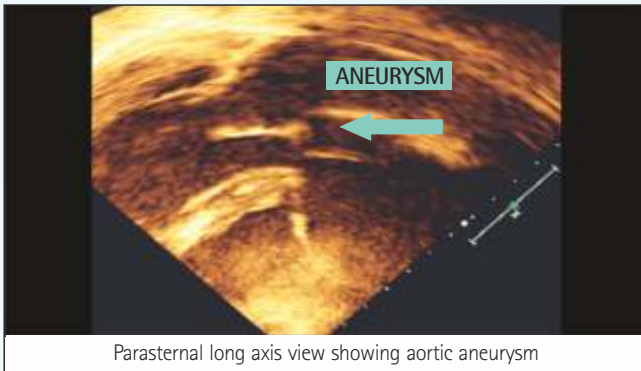
since 15 days. Patient was then underwent Echocardiography evaluation.

## ECHOCARDIOGRAPHY FINDINGS

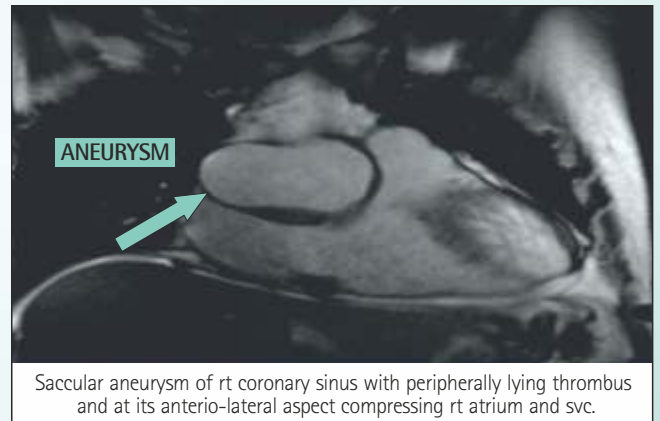
Echo was done which showed right aortic sinus aneurysm with suspicion of ruptured sinus of valsalva into right atrium. There was a layer of thrombus lying peripherally in the aneurysm.

Then CT angiography and Cardiac MRI were done which showed right aortic sinus aneurysm with suspicion of ruptured sinus of valsalva into right atrium. There was a layer of thrombus lying peripherally in the aneurysm. LAD and Cx arteries were normal in origin and caliber.





Saccular aneurysm of rt coronary sinus with peripherally lying thrombus and at its antero-lateral aspect compressing rt atrium and svc. blocked rca stenting (figurea and b)



Saccular aneurysm of rt coronary sinus with peripherally lying thrombus and at its antero-lateral aspect compressing rt atrium and svc.

## SURGICAL INTERVENTION

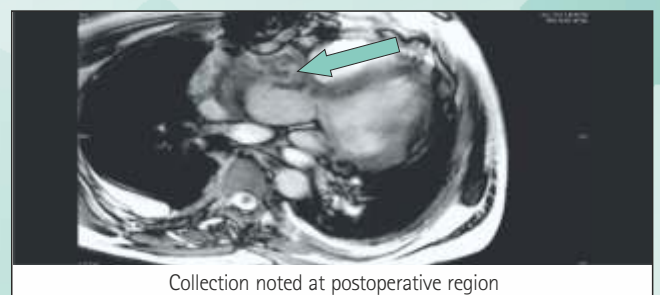
Surgery was done by CTVS team.

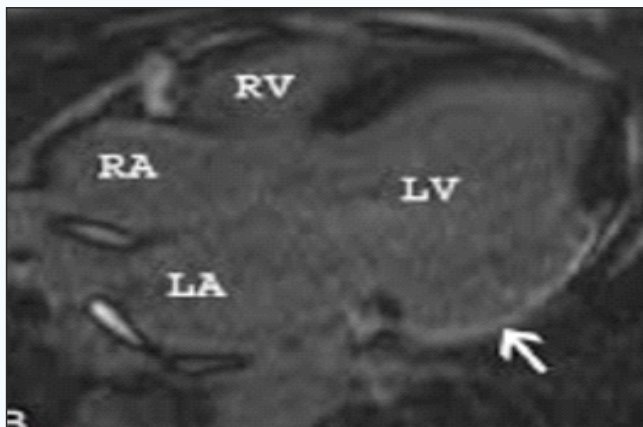
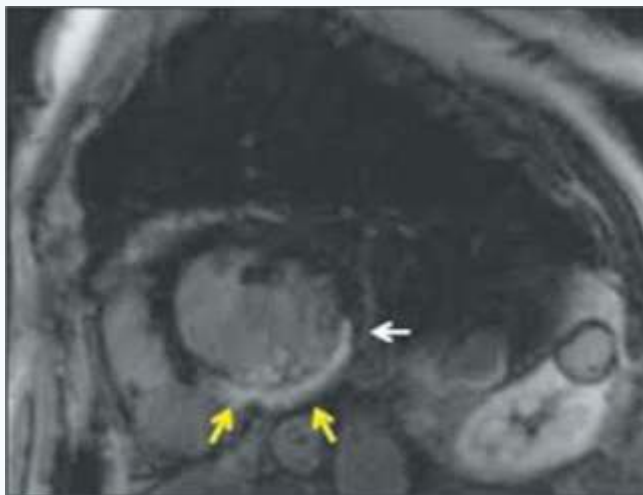
Procedure--repair of aorta was done from inside with dacron + pericardial patch using plegetted 4,0 prolene. Rest of blind sac resected out. Deairing of lv done. Rest of the deairing done through the root vent. Patient was successfully weaned off the cpb. Decannulation done

Post operative cardiac MRI was done on 5th day post surgery for following reasons. The indication were as following

1. Post operative status of ascending aorta
2. LV function and regional motion analysis
3. Cardiac viability

Post surgery Cardiac MRI showed small collection surrounding right aortic coronary sinus which were post-operative changes. Regional wall motion analysis showed hypokinesia of inferior wall of left ventricle. LGE images showed enhancement of more than 50% wall thickness consistent with non-viable myocardium involving medial-basal segments of inferior wall of left ventricle.





Late gadolinium enhancement images showing >50% wall thickness dead non viable myocardium involving inferior-medial -basal segments.

## DISCUSSION

Aneurismal dilatation most often involves the right coronary Valsalva sinus, followed by the no coronary and left coronary sinuses. The clinical manifestations of ruptured and no ruptured Valsalva sinus aneurysms vary widely, ranging from an asymptomatic heart murmur and insidiously progressive dyspnea to acute chest pain and cardiac arrest. The mainstay of treatment is surgical repair, although a few cases of successful, noninvasive transcatheter repair have recently been described. Although both ruptured and nonruptured Valsalva sinus aneurysms are associated with potentially fatal complications, after treatment the prognosis is excellent; for this reason it is important to make a prompt and accurate diagnosis. Most Valsalva sinus aneurysms are diagnosed on the basis of echocardiographic findings, with or without angiography, but both ECG-gated CT and MR imaging can provide excellent anatomic depiction, and MR imaging can provide valuable functional information.

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# Risk factors for patients undergoing treatment for Breast Cancer



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## ABSTRACT

Breast cancer is a complex disease, a variety of risk factors are involved in the aetiology and development of breast cancer. Risk factors for breast cancer include age, geographical location, socio-economic status, reproductive events, lifestyle factors, mainly alcohol, diet, physical activity and obesity. Assessment of risk factors is necessary to reduce the incidence of this disease.

## OBJECTIVE

To evaluate risk factors for breast cancer in patients undergoing therapy, mainly chemotherapy, radiation or surgery for treatment of breast cancer.

## METHODS

A total of 40 subjects were recruited for the study. The time period of the study was three months, January to March 2015. The study was



conducted at Max-Saket, New Delhi. The subjects comprised of women with breast cancer undergoing treatment, mainly chemotherapy, radiation and surgery. Volunteers who were pregnant were excluded from this study. A questionnaire method was used to get information. Data analysis was done using SPSS.

### RESULTS

Out of the 40 subjects, about 70% were overweight (BMI >25 kg/m<sup>2</sup>), whereas only 30% had a BMI <25 kg/m<sup>2</sup>. With regards to family history of cancer, number of subjects with a family history of cancer was same as those who did not have a family history of cancer (50%). In terms of breast feeding, 87.5% exclusively breast fed their child for less than 6 months, whereas about 10% exclusively breast fed their child for more than 6 months. With regards to physical activity, majority (65%) had a physical activity of less than 30 mins.

### CONCLUSION

Breast Cancer is a complex disease with a variety of risk factors. Assessment of risk factors is necessary to reduce the incidence of this disease. We found out that a higher BMI (>25 kg/m<sup>2</sup>), short duration of breast feeding (<6months) as well as reduced physical activity (< 30 mins) are major risk factors for breast cancer. A healthy lifestyle, with a normal body weight and daily exercise is therefore recommended.

### INTRODUCTION

Breast cancer is the most common cancer in women. It is the world's second leading cause of cancer death among women (after lung cancer). More than 1.1 million cases are diagnosed worldwide each year is a cancer of the female breast and more than 4, 10,000 patients die of it worldwide (Ferlay et al. 2010). Breast cancer is a complex disease, a variety of risk factors are involved in the aetiology and development of breast cancer. Risk factors for breast cancer include age, geographical location, socio-economic status, reproductive events, lifestyle factors, mainly alcohol, diet, physical activity and obesity (Dumitrescu, R. G. et al. 2005). Although child bearing is known to be protective against breast cancer, whether or not breast feeding contributes to this protective effect is unclear (The Lancet, 2002). Family history is known to be another risk factor for breast cancer. Family history of breast cancer among the mother or sister, poses a two to three fold increase in breast cancer risk (Ferlay et al. 2010). Other lifestyle factors like physical activity and normal BMI have been known to be linked to a decreased risk of breast cancer (Bernstein et al. 2008) (Clemens Metal, 2001). Around 30- 60mins/day of moderate to vigorous intensity physical activity is needed to decrease risk of breast cancer and is likely to be a dose-response relationship (Lee, I-Min et al. 2003). Smoking has a little or no effect on the risk of developing breast cancer (British Journal of Cancer. 2002). Women are at a higher risk if they have a higher socio-economic status or live in urban communities. However, urbanicity is not a proxy for an individual's socio-economic status and further research needs to be done on why living in such communities is associated with an increased risk of breast cancer (Robert et al. 2004). Women at a higher risk of breast cancer have a variety of options available to them, including watchful waiting, prophylactic surgery and chemoprevention. However, it is important to assess a patient's risk profile to ensure that the cost/ benefit ratio of the selected treatment is favourable (Clemens M et al, 2001).

### METHODS

The study is a hospital based randomised trial done to assess the risk factors of breast cancer. The study was conducted at Max-Saket, New Delhi. The subjects comprised of women with breast cancer undergoing treatment, mainly chemotherapy, radiation and surgery.

Volunteers who were pregnant were excluded from this study. A total of 40 subjects were recruited for the study. The time period of the study was three months, Jan to Mar'15. The selected participants were appropriately informed about the possible benefits of this study. Possible benefits of this study include assessment of risk factors for breast cancer. They were informed that their participation is completely voluntary and that they can withdraw at anytime. A Questionnaire method was used to get information regarding any family history of cancer, amount of physical activity and duration of exclusive breast feeding. BMI was calculated from height and weight measurements, i.e. weight divided by height squared (Quelet's index). Data Analysis was done using SPSS.

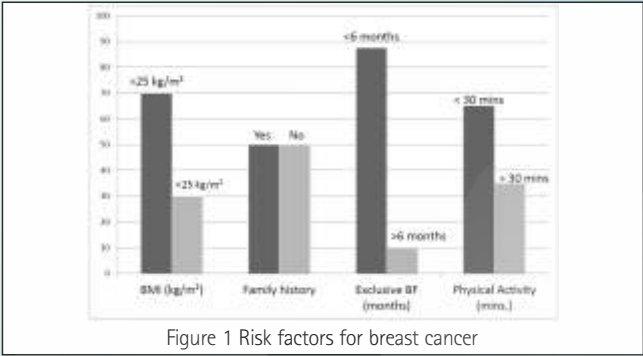
### RESULTS

The study population comprised of 40 women. Table 1 shows the basic characteristics of the subjects in the form of mean ± standard deviations

Table 1. Characteristics of the subjects (Mean ± Standard deviations)	
	All (n= 40)
Age (years)	51.0 ± 11.5
Height (m)	1.58 ± 0.1
Weight (kg)	68.5 ± 12.0
BMI (kg/m <sup>2</sup> )	27 ± 5

### BMI- BODY MASS INDEX

A BMI of greater than 25 kg/m<sup>2</sup> was considered as overweight, whereas that of below 25 kg/m<sup>2</sup> was considered as being normal. Out of the 40 subjects, about 70% were overweight; whereas only 30% were normal weight i.e. had a BMI <25 kg/m<sup>2</sup> (Fig 1). With regards to family history of cancer, number of subjects with a family history of cancer was same as those who did not have a family history of cancer (Fig 1)



Out of the 40 participants, 87.5% exclusively breastfed their child for less than 6 months, whereas about 10% exclusively breast fed their child for more than 6 months. In terms of duration of physical activity, majority (65%) had a physical activity of less than 30 mins.

### DISCUSSION

Breast cancer in women is a major public health problem throughout the world. It is the principal cause of death from cancer among women globally. About 55% of this global burden is currently experienced in developed countries, but incidence rates are rapidly rising in developing countries (Ferlay et al. 2010). Out of the 40 subjects, majority had a BMI of >25kg/m<sup>2</sup>. It is not surprising that high BMI is a risk factor for breast cancer. Several studies suggest that BMI is associated with increased levels of insulin and insulin like growth factors, which have been associated with increased risk of breast

cancer (Goodwin PJ et al. 2002). Especially in post menopausal women, accumulation of body fat is usually abdominal and abdominal obesity is strongly associated with Hyperinsulinemia, which is a risk factor for breast cancer (Stoll BA. et al. 1999).

Family history of breast cancer is an established risk factor (Graham A. Colditz. et al. 1996). In our study only 50% of the women had a family history of breast cancer. This is similar to a study in which it was found that eight out of nine women who develop breast cancer do not have an affected mother, sister or daughter. Although women who have first degree relatives with a history of breast cancer are at an increased risk of the disease (The Lancet. 2001). Lack of short lifetime duration of breast feeding, typical of women in developed countries is a major reason for a greater incidence of breast cancer among such countries (The Lancet, 2002). Our study found a similar result, showing that about 87% of women with breast cancer breastfed their children for less than 6 months.

Out of the total 40 subjects, 65% of the subjects indulged in a physical activity of less than 30 minutes in their daily routine. An Expert Panel of the International Agency for research on Cancer of the WHO estimated a 20% to 40% decrease in risk of developing breast cancer among most physically active women, regardless of their menopausal status, type or intensity of activity (Bianchini, F et al. 2002). Physical activity may modify menstrual cycle patterns and alter the production of ovarian hormones, which reduces the risk of breast cancer (Leslie Bernstein et al. 1994). The American Cancer Society guidelines recommend 150 minutes of moderate physical activity per week for adults for cancer prevention (Lin Yang et al. 2014).

Limitations: The entire information was self-reported. In terms of alcohol intake, no information on intake including type of alcohol consumed was reported. Also, precise assessment of physical activity was difficult in a population based study which might have resulted in biased reporting.

## CONCLUSION

Breast Cancer is a complex disease with a variety of risk factors. Assessment of risk factors is necessary to reduce the incidence of this disease. We found out that a higher BMI ( $>25 \text{ kg/m}^2$ ), short duration of breast feeding ( $<6$  months) as well as reduced physical activity ( $<30$  mins) are major risk factors for breast cancer. A healthy lifestyle, with a normal body weight and daily exercise is therefore recommended.

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# RADIOLOGY CASE OF THE MONTH

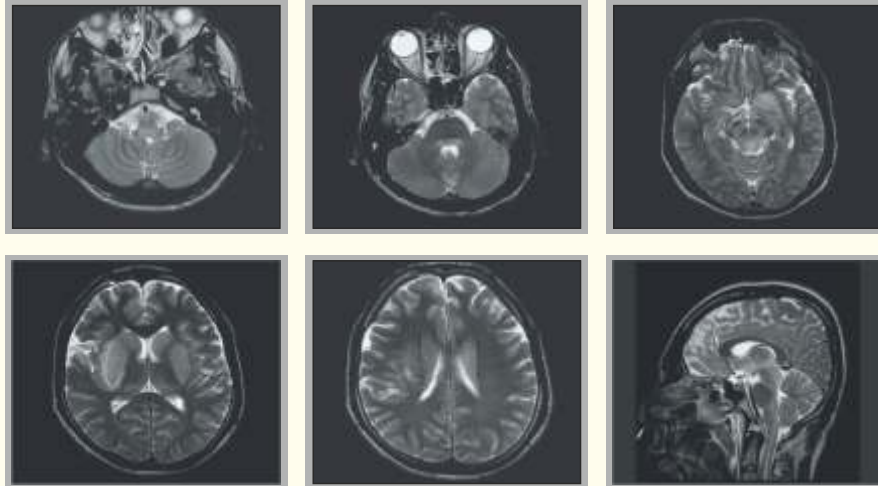
**Dr. Nafisa Shakir Batta** *Consultant*, **Dr. Dhruv Jain** *Sr. Resident*  
*Department of Radiology, Max Healthcare*

## Rabies Encephalitis

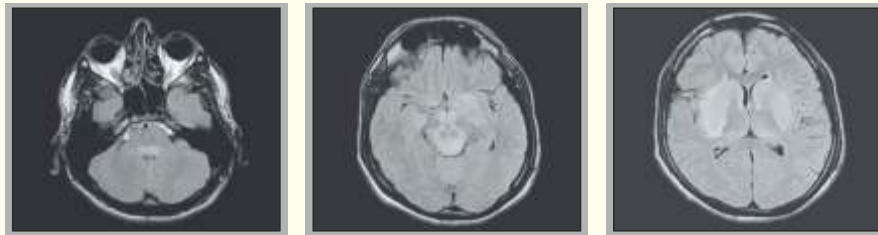
- 21 year old male brought unconscious to the hospital with history of dogbite.
- Non-contrast MRI was performed.

T2 weighted images exhibit symmetrical hyperintensity involving the bilateral basal ganglia, posterolateral thalami, midbrain, dorsal pons, medulla and central aspect of the cervical cord.

Axial and  
sagittal T2  
weighted  
images



FLAIR  
Images



## Diagnosis

Rabies Encephalitis  
Confirmed by immune viral markers.

## Rabies Encephalitis

Rabies Encephalitis is a rapidly progressive CNS infection resulting from infection by a member of an RNA virus of the family Rhabdoviridae, Genus Lyssavirus, most commonly transmitted to humans, from infected animals, via a bite. It results in rapid neurological deterioration and in almost all instances progresses to death.

Once introduced into the soft tissues, the virus enters unmyelinated nerve fibres and travels retrograde up the axons to the dorsal root ganglia, which can result in neuropathic pain. Once it reaches the central nervous system dissemination is rapid accounting for the fulminant clinical course.

MRI is the only modality of any use in the diagnosis of CNS Rabies, as CT is usually normal. Unfortunately, the very rapid progression of symptoms in this disease results in infrequent imaging, and a relative lack of literature on the imaging findings.

## Treatment and Prognosis

Unfortunately to date, no predictably effective therapy for CNS involvement by rabies has been developed, and in almost cases, the disease results in rapid decline of function, into coma and death (as was in this case).


Typical therapeutic attempts, which if instituted early have in some instances resulted in survival include: human rabies immunoglobulin infusion, rabies vaccine, ribavirin, interferon alfa, and ketamine.

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