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Role of Pan-Tilt Camera in Tele-interaction During Surgery at the Time of COVID-19 Crisis

Shijina Koliyath[1], Ravi Kumar Chittoria[2], Barath Kumar Singh. P[3]

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Abstract

Telemedicine plays an important role in imparting healthcare facilities worldwide in special situations like the COVID-19 crisis. Use of technology in healthcare has come a long way. Special cameras for surveillance and interaction have been used in fields of industries, offices, home based and national security systems etc. Here we describe our experience regarding the use of Pan-Tilt camera in tele-interaction during surgical procedures during the time of corona pandemic.

Keywords: Pan-Tilt (Pan-Tilt) Camera; Telesurgery; COVID-19 crisis.

INTRODUCTION

COVID-19 pandemic has been ravaging its influence and spreading all over the world in a rapid pace since its advent in December 2019 in Wuhan in China.[1] Lots of people all over the world have been affected including healthcare workers, many of whom have lost their life to the disease. Corona virus disease is spread by droplet infection and risk of spread of the infection in a hospital setting from patient to healthcare worker, from healthcare worker to another healthcare worker is high, especially when there is lack of personal protective equipment to healthcare workers worldwide. Social distancing has become a norm during the time of this corona crisis. Tele-interactions have become more and more popular with regards to consultations and imparting medical education. Thus, Telemedicine and tele-consultation has become an important aspect of healthcare worker patient interaction during corona pandemic. In this study we describe our experience regarding use of PT (Pan-Tilt) camera for live interaction between trainee surgeon and consultant during surgical procedure in the operating room.

MATERIALS AND METHODS

This study was conducted in a tertiary care center in the department of plastic surgery during April-May 2020 at the time of COVID-19 pandemic after the departmental committee ethical approval.

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Informed consent was taken from the participants, both healthcare workers and the patients. Pan-Tilt camera was installed in the operation theatre and smart phone devices were conFig.d and application was downloaded. Once the device is set and camera installed, the senior consultant interacted with the trainee surgeon during a surgical procedure to provide needful advice and to tele-monitor the procedure, thus maintaining social distancing norms and unnecessary exposure to corona virus. (Fig. 1, 2).

Fig. 1: Pan-Tilt Camera

Fig. 2: Tele-interaction between consultant and operating Surgeon.

Fig. 3: Tele-Interaction and Telemonitoring of Surgery by consultant from remote location.

The consultant interacted with the operating surgeon in real time and monitored thesurgery and provided useful inputs at that point of time through tele-medicine. (Fig. 3.)

Table 1: Feedback Proforma

Question	Consultant	Trainee Surgeon
1. Were you satisfied with the audio quality of the teleinteraction?	-	-
2. Were you satisfied with the video quality of teleinteraction?	-	-
3. Were you satisfied with the consultant-trainee interaction regarding clearing of doubts and tele-monitoring of surgery?		
4. Do you find this initiative cost-effective and reducing unnecessary Operating room visits?	-	-
5. Do you find it useful in practicing social distancing at the time of COVID-19 Pandemic?	-	-
6. Would you recommend it to be used by other practitioners/healthcare institutes?	-	-

The consultant was always available in case his physical assistance was required during the surgery. Feedbacks were taken from the consultant and the trainee surgeon at the end of interaction. (Table 1)

The steps of setting up the camera is given in the quick start guide provided with the device, the salient steps include:

1. Power On: Plug the power cable into the camera, and then plug the power adapter into an outlet.
2. Camera setup: a) Create an user account-download and install EZVIZ app.b) Add camera to EZVIZ. c) Enable the Image Encryption. d) Angle Adjustment.
3. SD Card Management
4. Mounting of the camera on wall or ceiling.

The details of each step with pictorial representation are provided with the user manual.

RESULTS

At the end of the study it was found that both the consultant surgeon and trainee surgeon gave positive feedback regarding the use of PT camera for tele-interaction during surgery. The application helped in maintaining social distancing and utilising telemedicine for patient care at the time of corona pandemic.

DISCUSSION

COVID-19 (Corona Virus Disease-2019) pandemic is spreading rapidly worldwide since its advent in December 2019. Human coronaviruses (HCoVs) represent a major group of coronaviruses (CoVs) associated with multiple respiratory diseases of varying severity, including common cold, pneumonia and bronchilitis.[2] Measures like maintaining social distancing, wearing masks, staying at home, avoiding social gatherings etc. have been implemented worldwide, many countries have declared lockdown for days allowing only emergency medical services and other essential services to function. Disease in healthcare workers is also on the rise owing to interaction with affected patients. Unnecessary hospital visits are being avoided. Patient monitoring and interaction has taken a new form owing to telemedicine services. Hospitals and healthcare workers are striving day by day to provide medical services to corona as well as non-corona patients taking precautions to not spread the disease from patient to healthcare workers and vice-versa. At this difficult times technology has helped in imparting medical education and training as well. All around the globe telemedicine lectures and seminars are being conducted in the form of webinars and other live interactions using applications like zoom, google meet etc. Technology in its varied forms is also being utilised for imparting medical education during surgical procedures to trainee surgeons as well.

WHO defines telemedicine as "The delivery of health care services, where distance is a critical factor, by all health care professionals using information and communication technologies for the exchange of valid information for diagnosis, treatment and prevention of disease and injuries, research and evaluation, and for the continuing education of health care providers, all in the interests of advancing the health of individuals and their communities.[3] There are various telemedicine applications which can be classified into 4 basic types, according to the mode of communication (video, audio, text based, according to timing of information transmitted (Real time video/audio/text interaction), according to purpose of consultation (diagnosis, treatment, health education, counseling for non-emergency consultation and immediate assistance or first aid for emergency consultation)and according to individuals involved (doctor to patient, doctor to care giver, doctor to doctor, healthcare worker to doctor).[4]

Pan tilt camera facility with smart phone device application can be used for various telemedicine applications. It is easy to set-up, user friendly, can be accessed from anywhere and of utmost importance at time of pandemics such as corona for maintaining practices of social distancing. The PT camera application is available freely in google play store/Apple store for all smartphones. Multiple users can install it for tele-monitoring and tele-interaction.

PT camera can connect using any available Wi-Fi network or mobile data (3G/4G) network. Once PT camera is conFig.d in a specific network, then tele-interaction is possible from anywhere, inside or outside the hospital.

The PT camera has the following features and specifications Resolution 720p or 1080p, Lens-4mm@F2.2, view angle 90 degree (diagonal) Pan and Tilt (Pan angle upto 340 degree, tilt angle upto 120 degree), Smart motion Tracking, Privacy mode, 2.4GHz Wi-Fi only, Night Vision(upto 33ft/10m), Two-way talk 16ft/5m Mic Pickup, Intelligent Linkage with alarm sensors via EZVIZ app, MicroSD Slot for Local Storage (upto 128GB). The operating conditions are temperature between 14degree Fahrenheit to 113 degree Fahrenheit. Dimensions 87.7X87.7x112.7mm, weight of 256gram. The camera costs around 11,300 Indian Rupees.

Once the application is installed and camera access is obtained, the camera can be accessed from anywhere from any distance provided internet connectivity is present. Many smart phone devices can be connected to a single camera.

These cameras have been traditionally used for CCTV surveillance for industrial and home based use. Their use in telemedicine has opened up new avenues. Some of the limitations include its availability and cost factor.

CONCLUSION

The use of PT camera for tele-interaction between consultant and trainee surgeon has been found useful especially in imparting medical education and patient care while upholding social distancing and avoiding unnecessary hospital visits. The limitations of the study include that it is a single institute study without any statistical analysis; further randomised controlled studies are required to further substantiate the results.

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Neutrophil Lymphocyte Ratio: A Prognostic Indicator of Limb Survival in CLI Patients

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Abstract

Aims and Objectives: This study was designed to evaluate admission neutrophil lymphocyte ratio in predicting risk of amputation in critical limb ischemia patients who could not get surgical or radiological (percutaneous transluminal angioplasty) revascularization.

Methods: A total of 150 patients presented with CLI to our hospital between June 2017 and June 2018 who could not have radiological or surgical revascularization are included in the study. Critical limb ischemia patients are those with is defined with ischemic rest pain and/or skin ulceration/gangrene in accordance to current guidelines reflecting patients with Fontaine class 3 and 4. This is a comparative study, 75 with CLI and rest pain and 75 without rest pain, so the NLR was significant in the rest pain group substantiated with the p value thus proving a vascular end point. An optimal cut-off value for the continuous NLR was calculated by applying a receiver operating curve analysis to discriminate between CLI and non-CLI. In our study occurrence of CLI significantly increased with an increase in NLR. A P value <0.05 was considered statistically significant and the CI was 95%. Analyses were performed using SPSS software.

Results: Using an NLR cutoff of ≥3.2, the area under the receiver–operating characteristic curve was 0.71 (95% CI 0.54-0.78). Overall, there were a total of 9 (0.06%) deaths and 135(90%) amputations. The amputations were above ankle in 103 (77%) and below ankle in 32 (23%).

Conclusion: The neutrophil lymphocyte ratio is an independent predictive factor for amputation in critical limb ischemia patients. An increased NLR is significantly associated with patients at high risk for CLI and other vascular endpoints. Stratification of patients with CLI according to admission NLR should be considered in the limb survival analyses of future adjuvant and neoadjuvant trials to validate these findings.

Keywords: NLR; chronic limb ischemia; gangrene.

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INTRODUCTION

Peripheral arterial occlusive disease is the obstruction or narrowing of the arteries supplying the peripheries. If untreated it can progress to critical limb ischemia where in the limb salvageability may be difficult. Hence PAOD must be promptly treated.

Critical limb ischemia (CLI) refers to arterial

occlusion causing marked reduction reduction in the blood flow to the extremities to a point causing rest pain, ulcers or even gangrene. It is a chronic condition which differentiates it from acute limb ischemia.

The risk factors for PAOD are hypertension, diabetes, smoking, dyslipidemia, hyperhomocysteinemia etc.

Also age plays an important risk factor, as the incidence of PAOD increases with increasing age. The incidence being 0.3% in men of age group 40-55 years and 1% in men above 75 years.

If PAOD is not diagnosed and treated timely, the patients are at a higher risk of developing complications like myocardial infarction or stroke. Critical limb ischemia patients are at a higher risk of developing generalized atherosclerotic disease.

Ankle brachial index (ABI) is simple indicator to diagnose critical limb ischemia. But in patients with mediasclerosis seen in oldage and diabetes, ABI becomes high due to stiffened arteries especially in the calf and ankle. Here the high ABI may not indicate a lowered perfusion to the extremity but only the stiffened arteries. Hence ABI is unreliable in patients with diabetes and oldage though these two factors are a high risk for CLI.

A high NLR has been shown to be associated with unfavourable outcomes in these circumstances. Poorer neurological outcome and increased mortality in stroke; increased mortality and major adverse cardiovascular events (MACE) in cases of acute myocardial infarction and increase in the morbidity and mortality of lower extremity artery disease. All these cases have been found to have an elevated NLR ratio.

This elevated NLR ratio indicates inflammation in the atherosclotic lesion. The increased neutrophils in the ratio is caused due to inflammation. These increased neutrophils release inflammatory mediators like arachidonic acid metabolites and platelet activating factors. This inflammatory stress causes cortisol induced stress response thus resulting in the relative reduction in lymphocyte count.

Thus this elevated NLR reflects an inflammatory state and hence associated with increased vascular endpoints like stroke, myocardial infarction or CLI.

MATERIAL AND METHODS

A total of 150 patients presented with CLI to our hospital between June 2017 and June 2018 who could not have radiological or surgical revascularization are included in the study. CLI is defined as PAOD patients presenting with ischemic rest pain and/or skin ulceration/gangrene in accordance to current guidelines reflecting patients with Fontaine class 3 and 4.[5] This is a comparative study, 75 with CLI and rest pain and 75 without rest pain,so the NLR was significant in the rest pain group substantiated with the p value thus proving a vascular end point. An optimal cut-off value for the continuous NLR was calculated by applying a receiver operating curve analysis to discriminate between CLI and non-CLI. In our study occurrence of CLI significantly increased with an increase in NLR.

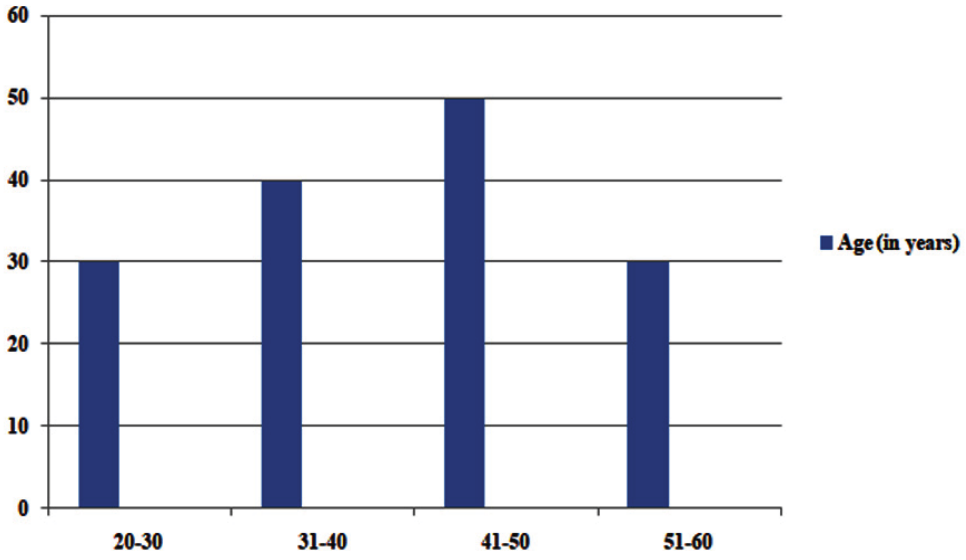

Fig. 1: Age distribution

The chart clearly shows the age distribution in our study with the maximum number of cases between the fourth and fifth decade of life, with the mean age being 45 years.

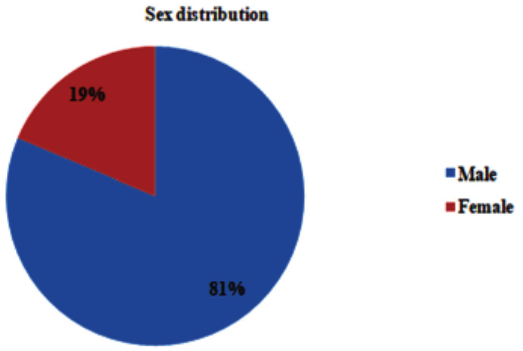

Fig. 2: Sex distribution

In our study, Males were affected more than females.

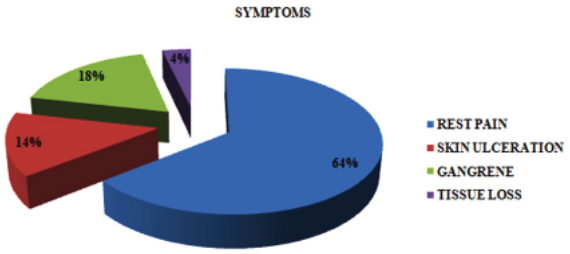

Fig. 3: Symptomology

RESULTS

Our study included 150 patients,

Group 1: 75 in no, CLI without rest pain

Group 2: 75 in no, CLI with rest pain.

Inclusion Criteria: Fontaine (Stage 3 & 4)

Rutherford (Grade 4, 5, 6)

Table 1: Results

Groups	Ampuation	Deaths	'P' Value
1	70	4	0.466
2	71	5	0.473

141 (94%) underwent Amputation and 9 (0.06%) deaths.

Using an NLR cutoff of 3.2, the area under the receiver operating characteristic curve was 0.71 (95% CI 0.54-0.78). A 'P' value <0.05 was considered statistically significant and the CI was 95%. Analyses were performed using SPSS software.

DISCUSSION

This study shows that NLR> 3.2 is associated with a higher risk of CLI in patients with PAOD.

Pathophysiology:

Chronic inflammation is an important factor in peripheral arterial disease being both a causative factor and also the consequence of peripheral arterial disease. The NLR id derived from the ratio of neutrophils and lymphocytes. Inflammation causes increase in the neutrophil count. These increased neutrophils release inflammatory mediators like arachidonic acid and platelet activating factors. This inflammatory stress causes cortisol induced stress response thus resulting in the relative reduction in lymphocyte count.

As atherosclerosis progresses chances of limb ischemia increases. The study shows that an elevated NLR increases the risk of amputation in patients with peripheral vascular disease.

Risk stratification models which uses the existing clinical data helps to distinguish between good or bad candidates for surgical intervention. The patient's proinflammatory state also adds to this score.

In the study by Turak et al. It showed that there was an increase in risk of restenosis of coronary vessels following bare metal stents in patients with elevated NLR. They showed that NLR>2.73 predicted stent restenosis with a sensitivity of 80% and specificity of 75%. Elevated NLR in these patients shows the presence of inflammatory activity thus increasing the risk of restenosis.

PAOD is believed to be caused by active inflammation caused by the neutrophils releasing inflammatory mediators like arachidonic acid mediators, platelet activating factors, oxygen derived free radicals and hydrolytic enzymes like elastase, myeloperoxidase, acid phosphatises and other hydrolytic enzymes.

NLR is a proinflammatory marker. Elevated C reactive protein and NLR usually indicates a poor long term outcome in patients those who have undergone oncologic resections and those with cardiac disease.

The relation between the Fontaine stage and the NLR was studied in patients with PAOD. Haumer et al. did not find any significant association between the Fontaine stage and neutrophil count in patients with critical limb ischemia or intermittent claudication.

Clinically it is difficult to differentiate patients who are at high risk for CLI. Ankle brachial index as already mentioned is a good indicator but is only limited by mediasclerosis, thus not accurate in old patients and those suffering from diabetes. Where as NLR is a simple index which as per our study can predict the risk of developing CLI in patients with PAOD.

Classification	Stage	Clinical description
Fontaine	I	Asymptomatic
	IIa	Mild claudication
	IIb	Moderate-to-severe claudication
	III	Rest pain
	IV	Ulceration or gangrene
Rutherford	0	Asymptomatic
	1	Mild claudication
	2	Moderate claudication
	3	Severe claudication
	4	Rest pain
	5	Minor tissue loss
	6	Severe tissue loss or gangrene

Fig. 4: Fontaine and Rutherford Classification.

CONCLUSIONS

A advantages of NLR:

1. Inexpensive and easy to perform
2. Marker in predicting in hospital and long-term mortality.
3. Postoperative mortality.
4. Predictor of outcomes in percutaneous coronary intervention and coronary artery bypass grafting.
5. Predicting instent restenosis.

If NLR value is high, then it indicates poor prognosis and the patient is at high risk of developing CLI and other vascular endpoint deficit. The findings of the present study demonstrate that NLR obtained from a universally available low-cost test (CBC with differential) provide relevant information regarding the risk of amputation in patients who are admitted with non reconstructable CLI.[10] Moreover, it is available preoperatively and may be of use in counseling patients with regard to treatment options and possible outcome.

High NLR is an excellent prognostic indicator in CLI patients. Stratification of patients with CLI according to admission NLR should be considered in the limb survival analyses of future adjuvant and neoadjuvant trials to validate these findings.

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Original Article

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End Stage Renal Disease: AVF for Hemodialysys: Clinical Assessment with/without Ultrasound Doppler, Complications and Failure

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Abstract

Objective/Background: The objective of this study was to study the complications and failure rate after creating arteriovenous fistula in patients suffering from end stage renal disease (chronic renal failure). It was also intended to study the importance of preoperative Clinical assessment/physical examination of the patient; and if the vessels for anastomosis appeared to be of doubtful size, then doppler study was done to ensure that vein is of adequate size for creation of a good fistula.

Method: In this study 121 cases of end stage renal disease (chronic renal failure) who needed vascular access for hemodialysis were taken. Ultrasound Doppler study was conducted in those patients whose vessels (for anastomosis) appeared to be of small size on Clinical examination. In the study, the arteriovenous fistulae were created under local anesthesia observing all aseptic precautions.

Results: Most commonly, difficulty encountered during surgery was when the caliber of vein was small i.e. less than 2.5 mm. Arteriovenous fistula was created only when the size of vein was atleast 2.0 mm. When the size of vein was small, then longitudinal incision was given in the vein or Cheatlemanouvre was undertaken to perform anastomosis. In 4 of the 121 cases when radiocephalic fistula was attempted, we had to convert to brachio-cephalic. No major complication was encountered during the surgery or post operatively. Some patients (five) had redness and inflammation. Inflammation and redness subsided with antibiotics and it resulted in satisfactory recovery. The fistulas started well showing good thrill. After 30 days, 106 out of 121 AV fistulas created were functioning very well with a patency rate of 87.6%.

Conclusion: There were no major complication after creating arterio venous fistula. It is important to do thorough physical examination before surgery so that vessel is assessed. In doubtful cases ultra sound doppler study should be done to know the size and patency of vessel. We should also take relevant history especially of hypertension, diabetes, i/v canulation etc.

Keywords: End stage renal disease; Hemodialysis; AV fistula; Patency; Ultrasound doppler.

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INTRODUCTION

Chronic renal failure is characterized with progressive and irreversible diminishing of Glomerular filtration rate.[1-4] Dialysis is a process which helps to carry out the important functions of kidneys. As such it is a substitute for natural functions of kidney. The population with end stage renal disease (chronic renal failure) is increasing and the number of patients who need dialysis is also increasing 10% of current patients every year.[5] Vast majority of patients suffering from chronic renal failure undergo hemodialysis.[6] Though there are many options for RRT (like hemodialysis, peritoneal dialysis, renal transplant and conservative management) but hemodialysis remains the common form of dialytic therapy.[7] Amongst the existing accesses, arteriovenous fistulas are closest to ideal.[8] Hemodialysis fistulas are surgically created communication between an artery and a vein in one of theextremity (usually radio-cephalic or brachio-cephalic fistula). The most common method for hemodialysis is through AV fistula and this increases the life standards of the patient.[9] Radiocephalicautogenous fistulas are the first choice for vascular access[10-14] because further fistulas can be created proximally if needed i.e. brachiocephalic or brachiobasilic fistula and the risk of steal syndrome is reduced.[11,13,15,16] The direct AV communications are called native AV fistula. For hemodialysis, prosthetics are also used as a mean of communication between artery and vein. Many patients have benefitted from prosthetic grafts when autogenous AVF was not feasible.[17-20] Studies indicate that about 30% of hospitalisations are caused by constructions and complications of vascular access.[21] In 1966, Brescia et al.[10] had first described and used AVF for hemodialysis. A fistula should be placed so that it is suitable for repeated punctures and allow fast blood flow rate for high efficiency dialysis with less complications. An ideal approach really does not exist.[22,23] Autogenous fistulas have demonstrated higher patency and lower infection rate as well as fewer complications than fistulas created with synthetic material.[24]

Pre-operative assessment by taking history and Clinical examination is fundamental before vascular access creation.[25] This includes age, comorbid conditions, plans like prospect of kidney transplant and in obese patients.[25] Apart from history and physical examination, ultrasound doppler is very useful. It is complication free diagnostic method. Studies show that graft placement has decreased and autogenous fistula formation increased.[26-31] So preoperative evaluation with ultrasound doppler may select suitable vessels and reduce AVF failures.[22] Doppler ultrasound allows assessment of arterial circulation based on series of morphological and functional parameters.[32] Allen test should be performed before creating vascular access to know the presence and functionality of palmer arches between radial and ulnar arteries.[33-36]

MATERIAL METHOD

This study was conducted in a total of 121 patients suffering from chronic renal failure (end stage renal disease) during the period 2020-21. All these patients were undergoing hemodialysis for chronic renal failurefor more than three months and needed vascular access for regular dialysis. Pre-operative assessment of the patient was done before creation of vascular access. History was taken regarding hypertension, diabetes mellitus. Assessment was also done for peripheral vascular disease, trauma and surgical intervention in the upper extremities, any anticoagulant therapy and history of previous vascular access. Allen test was done to assess the functionality of palmer arches. The patients in the study were having patent palmer arch as tested by Allen test and the minimum diameter of vein included in the study was 2.0mm. Three patients were HCV positive and all universal precautions (including special kits for surgeon and assisting staff) were taken during surgery. Hemoglobin level along with viral markers and RFT were done. On physical examination, if vessels were of small caliber, ultra sound doppler for the upper limb vessels was done in 14 cases. The doppler ultrasound was done with Philips HD 7 ultrasound machine using linear probe having frequency of 7 to 12 Mhz.

The vascular access (arteriovenous fistula) was created either between radial artery and cephalic vein (radiocephalic) near wrist or between brachial artery and cephalic vein (brachiocephalic) at elbow. All the fistulas were created under local anesthesia (using inj. xylocaine 2%) and it was given by local infiltration. First the vein was dissected and after visually confirming its size, the artery was dissected. 5000 international units of heparin was given intravenously and the distal end of vein was ligated. The artery was clamped using two bulldog clamps at a distance of about 1.5 to 2.0 cm. End to side anastomosis was done between vein and artery using 6‘0’ monofilament prolene for continuous suture. Blood flow was restored by removing the clamps on the artery and vein. The thrill over the fistula was felt to assess the functionality of the

fistula. The wound was closed using interrupted nylon sutures after ensuring that there is no leakage from the anastomosis or the wound site. Patient was advised not to get BP checked from that limb and avoid any injection on the operated limb. Patient was also advised to start exercise after 24 hours. Post-operatively antibiotic was given for seven days and sutures were removed between 10 to 12 days.

RESULTS

The study which consisted of 121 patients (who required vascular access for hemodialysis) was conducted during the period 2020-21. Only two patients were below the age of 20 years while majority of the patients were between the age of 31 and 60 years i.e 96 patients out of 120 were in this age range (Table 1). Males out-numbered the females and the male female ratio was 77.68:22.31 i.e 94 males and 27 females (Table 2). In the study 85 fistulas were created first time while in 36 case the fistula was created for the second or third time after the first fistula stopped functioning over the period of time or the previous fistula failed for some reason. When the vein caliber was small, we had to cut the vein or do cheatlemanouvre so that the anastomosis is adequate. In four cases where we started with creating radiocephalic vascular access was converted to brachiocephalic fistula because of inability to make radiocephalic fistula. In five cases there was redness and inflammation due to infection which subsided with antibiotics. Apart from this, there was no other complication encountered in the study. Post-operatively, the fistulas started very well and the patency after one month was 87.6% with 106 functioning fistulas out of a total of 121.

Table 1: Age wise incidence:

S. No.	Age in years	No. of patients
1	01 to 10	01
2	11 to 20	01
3	21 to 30	08
4	31 to 40	26
5	41 to 50	34
6	51 to 60	36
7	61 to 70	11
8	71 and above	04
9	Total	121

Table 2: Sex ratio

Male patients	94
Female patients	27
Total	121

Table 3: Complications

Inflammation /Redness	5 patients
Pus Formation	0 patient
Paraaesthesia	4 patients

Table 4: Patency rate:

Patency after 1 month	106 out of 121 cases (87.6%)
Patency after 3 months	102 out of 121 cases (84.3%)

DISCUSSION

Hemodialysis through AV fistula remains the most common method of dialysis. Autogenous fistulas have higher patency rate, lower infection rate and fewer complications than fistulas created with synthetic material.[24] Amongst the existing accesses for dialysis, arteriovenous fistulas are closest to ideal.[8]

121 cases of end stage renal disease (chronic renal failure) were considered for creation of vascular access. In 85 cases the vascular access (arteriovenous fistula) was created for the first time and in these patients the disease duration was more than two months. In 36 cases fistula was created second or third time after the previous fistula became non functional over a period of time or due to failure. 78 fistulas were created between brachial artery and cephalic vein (brachiocephalic fistula) and 63 were radio cephalic fistulas between radial artery and cephalic vein. In 23 cases, ultra sound doppler study helped to decide in choosing the site of creation of vascular access. Fistula was created only when size of vein was atleast 2.0 mm. It is accepted that a very small caliber vein will fail, but there is no agreed minimum venous diameter to predict radiocephalic AVF maturation.[37] Immediate failure on the day of surgery is generally regarded as technical failure of surgery[38] but can also be due to inadequate vessel.[39] Studies have shown that cephalic vein of 2.0mm or less have higher failure rate and should not be considered.[22,40-44]

Pre-operative physical examination has been shown to predict success rate in about 70-80%. Doppler ultrasound has increased the number of patients who are suitable for AVF. Preoperative evaluation with ultra sound may help in selecting suitable vessels and reduce AVF failures.[21] Of course ultrasound examination is more time consuming than physical examination and requires

an experienced examiner and special equipment. Doppler ultrasound is noninvasive, safe and repeatable.[45] Doppler Ultrasound may not be done routinely but used when anomalies appear on physical examination.[46] International guidelines, however, recommend its use in allpatients who are candidates for AVF along with physical examination.[47]

CONCLUSION

In this study we found that vascular access can be created safely and there are no major complications. The results of the surgery are good. Although physical examination is important for prediction of successful AVF but in selected cases use of ultrasound doppler helps in deciding the site for AVF and whether adequate size vein is available. Patient should be advised regarding post operative precautions like avoiding injection, BP measurement, keeping arm under the body on the operated side. The patient should also be told to start exercise after 24 hours.

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Role of Upper Limb Elevation in the Management of Hand Edema in a Patient with External Fixator Our Experience

Nishad. K.[1], Neljo Thomas[2], Ravi Kumar Chittoria[3], Barath Kumar Singh[4], Jacob Antony Chakiath[5]

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Abstract

Upper limb edema after any trauma or after any surgical procedure is very common. The edema of the hands can cause many complications including the stiffness of the joints. So, the edema of the hands should be managed promptly to get optimal results. There are many methods to reduce hand edema. Hand elevation is one of the time-tested methods to deal with hand edema. Hand elevation can be done by various methods. But in a certain number of patients who are on skeletal stabilization with an external fixator can find it difficult to elevate using a conventional cuff and collar or pillow. In such a patient we tried hand elevation using cloth and IV stand. The hand circumference of the patient was measured daily using a fabric tape and the findings were noted serially for two weeks results showed that edema reduced considerably following and elevation. The method is easy, safe, reproducible, and less costly.

Keywords: Upper limb Oedema; Hand Elevation; External Fixator; Necrotizing Soft Tissue Injury.

INTRODUCTION

Any trauma can induce inflammation, the cardinal signs of inflammation are swelling, redness, heat, and pain. Edema can cause pain, discomfort and later if persistent can cause many complications. Edema can be reduced using many methods like hand elevation, compression dressings, etc.

Hand elevation is one of the commonly followed methods to decrease hand edema, Hand elevation can be done using Cuff and collar, pillow, etc. But in a certain number of patients who have External fixators for skeletal stabilization may find it difficult to elevate the limb due to the position of the external fixator and its weight The elevation can impart stress on the joints and the ones which are available in the market are usually costly and may not be affordable for all. The patient may become non – compliant with the whole process due to all these. Thus, the ideal method for upper limb elevation for hand edema should be; effective, adjustable according to the requirements of the patient, easy to apply, should not impart stress on the nearby joints

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and should support the upper limb, and should not cause any injury or side effects and affordable.

In this article, we are sharing our experience of using a simple, cost-effective, and effective method to elevate an upper limb for hand edema.

MATERIALS AND METHODS

This is a prospective, non-randomized, non-comparative study conducted in the Department of Plastic Surgery in a tertiary care center in South India. Department scientific and ethical permission was sought. Written informed consent was taken from the subject under study.

A 63-year-old lady with necrotizing soft tissue injury of the right forearm extending to arm with involvement of elbow joint. she was managed with extensive debridement, antibiotics, and skeletal stabilization withan elbow spanning external fixator (Fig. 1 and 2).

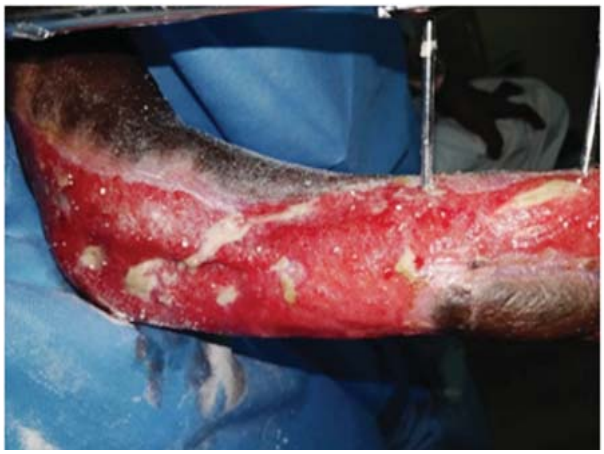

Fig. 1: The upper limb with external fixator and raw area

Fig. 2: Extensive raw area of the upper limb with near circumferential involvement

The patient developed extensive edema over the dorsum of the hand. The patient was advised right upper limb elevation but due to the external fixator,the patient was finding it difficult to keep the upper limb elevated with a Cuff and collar or pillow. The upper limb elevation slings available in the market were not affordable for the patient, hence the patient was given hand elevation using a triangular cloth, gauze and IV stand already available in the ward (Fig. 3). The two ends of the cloth were tied together using gauze to make the cloth appear like a bag and the other end of the gauze was tied to an IV stand. The length of the Gauze string was kept long so that the length can be adjusted to suit the patient's requirements while the patient was sitting or lying down.

Fig. 3: The Patient's Right Upper Limb with External fixator Elevated

The hand circumference of the hand was measured daily using a fabric measuring tape and findings were noted for consecutive 14 days. (Table 1)

Table 1: The hand Circumference

Days	Circumference in Centimeter
1	17.5
2	17.2
3	17.0
4	16.8
5	16.5

6	16.1
7	15.8
8	15.6
9	15.4
10	15.4
11	15.3
12	15.3
13	15.3
14	15.4

RESULTS

The upper limb with External Fixator can be elevated safely and effectively using a triangular-shaped cloth, a gauze, and an IV stand. The upper elevation showed a decrease in edema, decrease in pain, and without any complications. (Fig. 4)

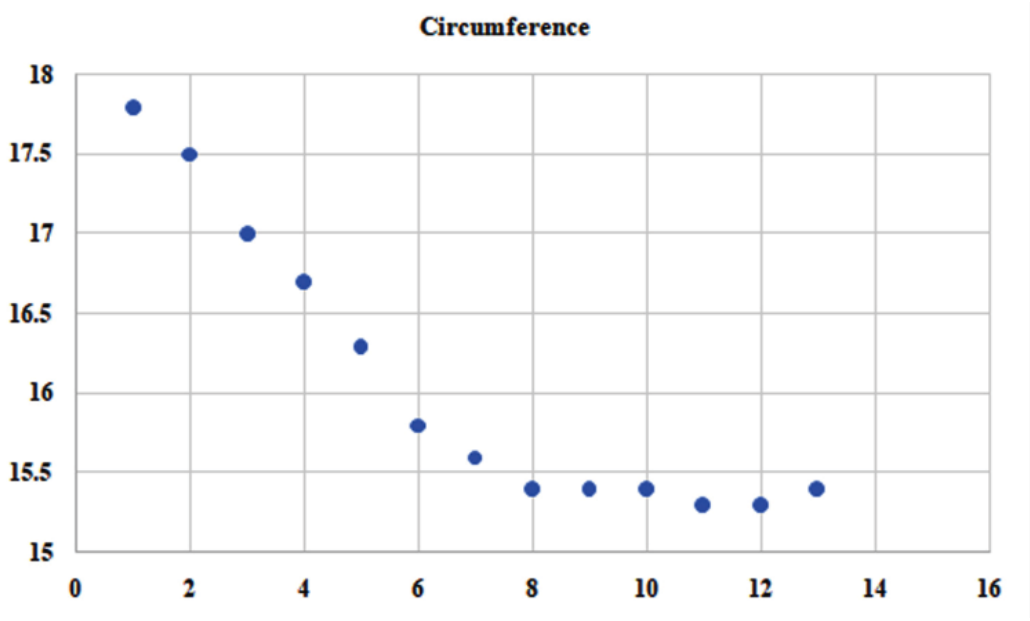

Fig. 4: Hand Circumference Plotted Against the Days (Circumference in centimeters)

DISCUSSION

The inflammationhas four cardinal signs. Swelling, redness, heat, and pain1can be seen after any trauma or surgery. Edema can be defined as abnormal accumulation of fluid in the interstitium, which are located beneath the skin or in one or more body cavities.[2,3] The amount of post-operative edema depends on body response to the injury, extend of tissue injury, or extent of the procedure. The increased vascular permeability leads to the extravasation of fluid into the extracellular space. While increased permeability is a result of histamine and histamine like factors that are released as a result of an insult like trauma or surgery. Increased vascular permeability can also be due to direct vascular or cellular injury. Endothelial cell destruction occurs by extensive surgical dissection. The more damage the cells sustain, the more severe will be the oedema. Lymphatic vessels play a key role in removing the protein rich fluid from the extracellular spaces and lymphatic vessels rapidly dilate to several times their normal caliber early in the inflammatory phase, but in conditions where extensive soft tissue loss, the lymphatic drainage may be slow.

Edema increases tissue pressure, which may causean increase in pain. When pain is severe it inhibits the patient's ability to use the limb. the natural pumping action of the muscles is decreased, which further increases edema and leads to tissue fibrosis. Increased capillary filtration causing edema and an increased endo neural fluid pressure may lead to decreased nerve blood flow and tissue oxygen tension causing nerve ischemia. This may be a reason why the pain decreases with decreasing edema.

The patient was complaining of pain and discomfort, decreased ability to use the hands, and edema. Kawasaki et al. found that the circulation of lower limbs is better in hanged positions (in a

lower level than heart), but staying for a long time in this position causes venous congestion, edema, and delayed wound healing 4 hence the decision of keeping the upper limb elevated was taken. *Boland RA and et al*. compared three methods of hand elevation on reduction of hand edema, 30 degree angle, horizontal elevation, and 30 degree head of the bed elevation. they found that 30 degree elevation of the upper limb is more e-ective than the other two methods.[5] The weight of the metallic external fixator and the projecting rods were limiting the patient from being compliant to the hand elevation using cuff and collar as well the pillow so it was difficult to maintain the required angle of elevation. Another option to reduce edema was compression bandages, this option was also considered because one study conducted by Fagan et al. on the e-ects of upper limb elevation onhand edema after carpal tunnel syndrome surgery and showed that limb elevation has no e-ects on reducing the hand oedema.[6] But since the patient was on the external fixator the effective application of the compression bandage was difficult, hence this option was dropped after discussion. We found that the 30 degrees of hand elevation was beneficial for our patient and there was a considerable decrease in edema and throughout hand elevation, there was no recurrence of edema

The limitation of the study is that this was conducted only on a single patient and we suggest a randomized controlled study with a large number of subjects.

CONCLUSION

Hand elevation is an effective method to decrease the post-operative edema and the upper limb with External fixation can be elevated using a cloth and IV stand, this method is simple, easy to apply, cost-effective and the compliance to this method is also good moreover no complications were noted.

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Case Report

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Ruptured Liver Abscess in Children: A Rare Case Presentation

Kalara Dhaval Kumar[1], Jignal Kumar P. Sonavale[2]

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Abstract

Liver abscess is a common condition in tropical countries and is associated with significant morbidity and mortality. Traditionally, there are two major classifications of hepatic abscess; pyogenic and amoebic. There are various complications associated with hepatic abscesses, of which, rupture of the abscess is the most common. Intraperitoneal rupture of liver abscess is a rare but potentially fatal disease.

Accurate preoperative diagnosis is difficult and often necessitates exploratory laparotomy for peritonitis. Improving imaging techniques have aided the CLInicians in the diagnosis of hepatic abscesses and have subsequently become important treatment tools, the demographics of the hepatic abscess have changed. Though open surgery still remains most commonly used management modality, with advent of minimally invasive surgery. Thus, multiple management options are available today and ruptured liver abscess is a preventable and manageable. No specific guidelines are available for choosing the modality of treatment. Thus, this article purpose is to report a case of a patient that presented with acute abdomen at the emergency caused by a rupture liver abscess. A 7 year old male child presented to the Emergency Department due to severe abdominal pain during the last 7 days. The pain was located in the RHC, associated with constipation and three to four episodes of vomiting. On physical examination, generalized abdominal tenderness was present without any guarding or rigidity and no abdominal lump palpable. There were no signs of peritonitis. Blood tests including complete blood count, serum electrolytes, bilirubin, and liver and kidney function tests were performed which were unremarkable and showed no other abnormalities. Prothrombin time, partial thromboplastin time and INR (International Normalized Ratio) were normal. In our case in diagnostic laparoscopy after initial abdomen exploration around 200cc purulent fluid filled peritoneal cavity noted and ruptured liver abscess diagnosis confirmed so diagnostic laparoscopy converted to exploratory laparotomy. Peritoneal lavage given with approx 1500cc warm saline.and metronidazole wash is also given.after clearing all toxic fluid and. All abdominal organs examined and layer wise closing done.

The total operative time was 120 minutes and our patient's post-operative period was unevetful. He was discharged on the seven post-operative day.

Keyword: Ruptured liver abscess; Pediatrics age group; Pediatrics Surgery; Payogenic liver abscess.

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INTRODUCTION

Liver abscess is a common condition in tropical countries and is associated with significant morbidity and mortality. Traditionally, there are two major classifications of hepatic abscess; pyogenic and amoebic. There are various

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Accurate pre-operative diagnosis is difficult and often necessitates exploratory laparotomy for peritonitis. Improving imaging techniques have aided the clinicians in the diagnosis of hepatic abscesses and have subsequently become important treatment tools, the demographics of the hepatic abscess have changed. Though open surgery still remains most commonly used management modality, with advent of minimally invasive surgery. Thus, multiple management options are available today and ruptured liver abscess is a preventable and manageable. No specific guidelines are available for choosing the modality of treatment. Thus, this article purpose is to report a case of a patient that presented with acute abdomen at the emergency caused by a rupture liver abscess.

CASE REPORT

- A 7 year old male child presented to the Emergency Department due to severe abdominal pain during the last 7 days. The pain was located in the RHC, associated with constipation and three to four episodes of vomiting. On physical examination, generalized abdominal tenderness was present without any guarding or rigidity and no abdominal lump palpable. There were no signs of peritonitis. Blood tests including complete bloodcount, serum electrolytes, bilirubin, and liver and kidney function tests were performed which were unremarkable and showed no other abnormalities. Prothrombin time, partial thromboplastin time and INR (International Normalized Ratio) were normal.
- During the investigation, abdominal ultrasound showed 6.5 *6.0*6.4 cm3 (132 cc) sized hypoechoic lesion with internal echoes with internal vascular noted in right lobe of liver Reaching up to subcapsular surface, likely partially liquified liver abscess,with moderate free fluidin abdomen with thick moving internal echoes, possibility of ruptured liver abscess.
- Laparoscopic approach was attempted which was later converted to open surgical approach through midline incision, approx. 200ml purulent fluid found in peritoneal cavity fluid was drained out and sent for further analysis. 2* 2*4 cm3 cavity was found in right lobe of liver segment no 5 & 7. 1500 ml peritoneal lavage with warm normal saline given. The total operative time was 120 minutes and the patient was discharged home seven days after the procedure without intercurrences.

Fig. 1: Laproscopic View of Peritoneal Fluid

Fig. 2: Laproscopic View of Liver Cavity

Fig. 3: Liver Abscess Cavity

DISCUSSION

Liver abscess can be defined as a suppurative encapsulated collection in the hepatic parenchyma that may be bacterial, parasitic or fungal. Late diagnosis is often associated with the occurrence of complications. Rupture is the most common complication associated with high morbidity and mortality. Several factors of rupture have been described in the literature. Their knowledge can lead to propose the best treatment to avoid complication. The risk factors of rupture can guide the therapeutic choice between medical treatment alone and medical treatment associated with percutaneous drainage. Thus, it is important to know the factors that should prompt early drainage. Drainage allows also to speed up the recovery process and reduces the patient's hospital stay.

In our case in diagnostic laparoscopy after initial abdomen exploration around 200cc purulent fluid filled peritoneal cavity noted and ruptured liver abscess diagnosis confirmed so diagnostic laparoscopy converted to exploratory laparotomy. Peritoneal lavage given with approx 1500cc warm saline and metronidazole wash is also given. after clearing all toxic fluid and. All abdominal organs examined and layer wise closing done.

The total operative time was 120 minutes and our patient's post-operative period was unevetful. He was discharged on the seven post-operative day.

CONCLUSIONS

Liver abscess in children is still very common in developing countries; Pyogenic liver abscess (PLA) is more common than amebic, fungal, or other etiologies. Imaging with ultrasonography and/or CT is diagnostic. Antimicrobial therapy along with percutaneous drainage constitutes the mainstay of treatment, whereas open surgical drainage should be reserved for selected cases like ruptured liver abscess.

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Case Report

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A Case Report on Thoracotomy for Left Bronchogenic Cyst Excision

Parth Nilesh Mehta[1], Harish Devjibhai Chauhan[2]

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Abstract

Bronchogenic cysts are uncommon congenital anomalies of foregut origin usually located within the mediastinum and the lung and rarely diagnosed in adults. Surgical excision is the recommended to establish diagnosis based on histologic examination, alleviate symptoms if present, and prevent future complications. Thoracoscopic approach is becoming the primary therapeutic option.

Keywords: Video-assisted thoracoscopy; Thoracotomy; bronchogenic Cyst; mediastinum.

INTRODUCTION

Bronchogenic cysts are congenital lesions thought to originate from the primitive ventral foregut and may be mediastinal, intrapulmonary, or, less frequently, in the lower neck. Approximately two-thirds are within the mediastinum, and one-third are intraparenchymal.[1,2] They account for 40–50% of all congenital mediastinal cysts, and there is a slight male predominance. The true incidence of bronchogenic cysts is unknown presumably because most patients are asymptomatic. However, once the condition is diagnosed, surgical excision is indicated either to relieve clinical symptoms, or because of enlarging cysts or to prevent possible complications, such as infection, malignant transformation, tracheal compression, superior vena cava syndrome or haemoptysis.[3,4] The complete excision of the cyst is the gold standard and recurrence is extremely rare.

PATIENT AND METHOD

In our case, a 27 year old male patient came to the SMIMER hospital with chief complaints of left sided chest pain and dyspnoea for past two weeks. Patient underwent Chest X-ray with showed ill defined round soft tissue opacity on upper side of lt. lung field. Further patient was advised for CECT THORAX with showed approx, 7.6 * 7.3 * 8.0 cm sized well defined cystic (mean CT HU 30-35) posterior mediastinal lesion. Also MRI LT. THORAX (local part) was done and that suggested a well defined lobulated lesion measuring 88 * 71 mm in apex of left lung extending and abutting the mediastinum. Compression of the adjacent lung parenchyma was present.

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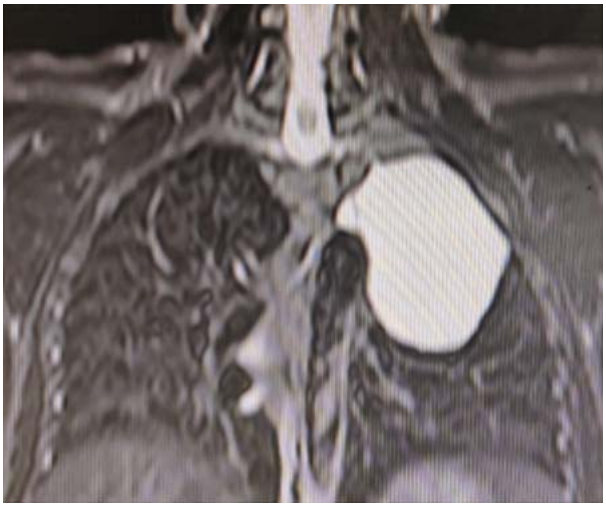

Fig. 1: Mri Image of Thorax Showing Cyst in Lt. Lung Upper Lobe.

After double lumen intubation, with the patient in lateral decubitus position, the first trocar was placed usually in the seventh or eight intercostal space, while the remaining two or three trocars were placed after visualization of the cyst. Anterior or posterior rotation of the operative table was helpful in lung retraction and cyst visualization. Cysts were excised with blunt and sharp dissection using hook-electrocautery or endoscopic scissor. Great care was taken to avoid injuries to the phrenic, vagus or laryngeal nerves. Due to much adhesions with the lung, VATS was converted into open thoracotomy to deliver out the cyst. At the end of the procedure, before lung re-expansion one chest tube was placed. Postoperative pain control was assured by intravenous analgesia.

Fig. 3: Gross Image of the Bronchogenic Cyst

Fig. 2: Plain Chest X-Ray Lateral view showing Opacification in Upper Lung field

DISCUSSION

Bronchogenic cysts account for 10–15% of all mediastinal tumors and about 60% of mediastinal cysts. Usually this is a benign condition and some clinicians accept a conservative management with simple observation in asymptomatic patients.[5] Bronchogenic cysts do not initially communicate with the tracheobronchial tree. They usually present as a unilocular, fluid-filled cyst in the middle or posterior mediastinum. Differential diagnosis includes Oesophageal duplication cyst, neuroenteric cyst and congenital cystic adenomatoid malformation.[2] Intrapulmonary bronchogenic cysts are usually located in the lower lobes. The cysts are filled with serous or mucous fluid, so usually appear as water-density mass lesions in chest radiographs. Two-thirds of the patients are symptomatic; symptoms are due to the size and position of the cyst. Symptoms are most frequently caused by compression of the trachea or bronchi, which leads to coughing, wheezing, stridor, dyspnoea, cyanotic spells, and pneumonia. However, most bronchogenic cysts are found incidentally when imaging is performed for other reasons. Surgery is indicated for symptomatic or complicated cyst.

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