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Case Stduy

An Indirect Inguinal Hernia Repair after Nitya Virechana a Case Report

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A B S T R A C T

Over time, an inguinal hernia may develop due to increased pressure on the walls of the abdominal muscles from activities such as straining, prolonged coughing, being overweight, or lifting heavy weights. Acharya Sushruta referred to inguinal hernia as *Antravridhhi*[1]. This condition may be associated with symptoms such as dragging pain and discomfort. Paresthesia may occur in some patients due to compression or irritation of the inguinal nerves by the hernia. An indirect inguinal hernia which does not extend to the scrotal sac should be managed as *vata vridhhi*[2]. In describing the operative management of vata vridhhi, Acharya Sushruta recommended certain therapeutic procedures as a *purvakarma* of *Vatavridhhi chikitsa*. The patient undergo *Nityavirechana karma* with Eranda taila and Milk for 7 days, followed by hernioplasty on the 8th day. Tension-free mesh hernia repair has become the predominant method for treating inguinal hernias.

Keywords : Inguinal Hernia, *Antravridhhi, Vatavridhhi chikitsa, Nitya virechanakarma*, Hernioplasty

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INTRODUCTION

A hernia is a protrusion of a viscus or part of a viscus through an abnormal opening in the walls of its containing cavity[3]. The external abdominal hernia is the most common form, the most frequent varieties being the inguinal hernia. An indirect inguinal hernia travels down the canal on the outer (lateral and anterior) side of the spermatic cord. A direct inguinal hernia comes out directly forwards through the posterior wall of the inguinal canal. Indirect hernias are most common in the young one, whereas direct hernias are most common in the old one. In the first decade of life, inguinal hernia is more common on the right side in the male. This is no doubt associated with the later descent of the right testis and a higher incidence of failure of closure of the Processus vaginalis[4].Acharya Sushruta has described regarding inguinal hernia as a *Antravridhhi* in *Adhyaya* 12th of *nidanasthana* and *Adhyaya* 19th of *chikitsasthan* of *sushruta samhita*. When vitiated *Vata dosha* travel downward in the *Phalakoshvahini* and produce giant swelling is known as *Vridhhi*. The aetiology of Hernia according to Ayurveda is aggravate of *Vata dosha* which causes displacement of intestine or its part into the groin region leading to swelling in the form of *Granthi*[5]. If this condition persisted for long time then vitiated *Vata* pushes intestinal part downwards and *Vayu* moves further down and leads swelling of scrotum. He has described seven types of *vridhhi*,*Antravridhhi* is one among them. Susruta mentioned about three types of treatment for this condition –*Bheshaja, Agnikarma and siravedhana*[6]. *Vatavridhhi chikitsa* can be applied in primary stage of inguinal hernia which mainly includes *Shamana* drugs metioned by Acharya.

CASE REPORT

A 62-years-old male patient (OPD no - 16762, IPD no - 891) got admitted under Shalya Tantra department of Government Akhandand Ayurvedic college & Hospital,

Ahmedabad on 03/07/2023 with complains of bulging mass in the inguinal region accompanied with pain and discomfort in the last 1.5 years.

Place of study- P.G.Department of Shalya Tantra, Government Akhandanand Ayurvedic college & hospital Bhadra, Ahmedabad , Gujarat .

History of Illness- As per the statement of the patient he was apparently healthy before 1.5 years. He gradually noticed swollen mass along with pain near the inguinal region. Mass comes out while coughing, walking, straining for motion, lifting heavy weight. In the last 1 month the mass has increased in size hence for further management he has approached our hospital.

History of Past Illness–No any H/O: DM/HTN/IHD

Clinical Findings - On Examination: BP - 130/80mmHg, PR - 78 bpm, R.R – 18 /min

General Examination- Built: Moderate, Nourishment: Moderate, Temp: Afebrile. No evidence of Pallor / Icterus / Cyanosis / Clubbing / Oedema / Koilonychia / Lymphadenopathy

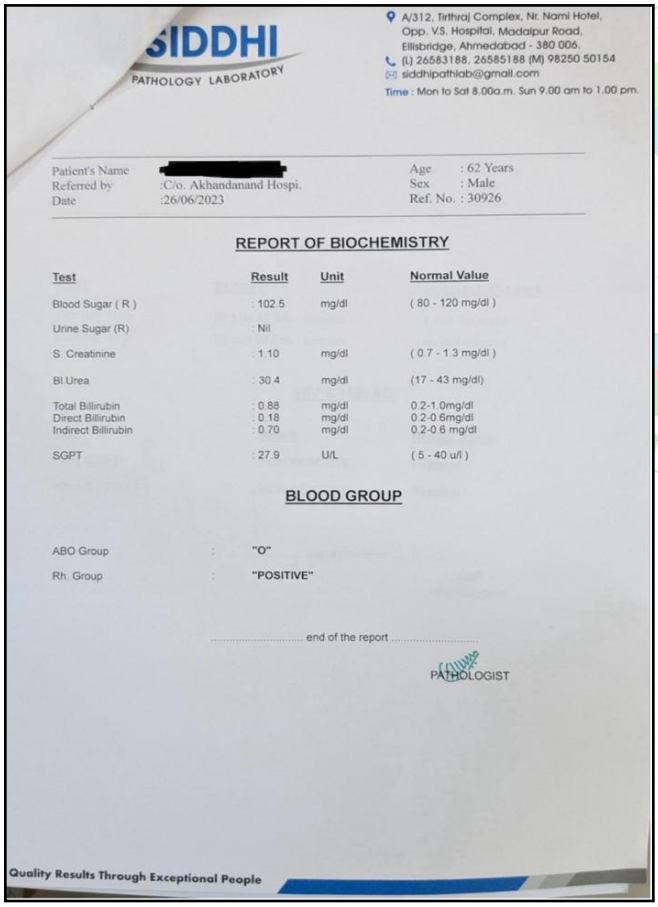
Systemic Examination - CNS: Conscious, well oriented to time, place and person, CVS: S1 S2 heard, no added sounds, RS: B/L AE+, B/L Air entry equal and clear, P/A: Soft and Non-distended, Tenderness noted at right iliac fossa.

On Inspection-Location: Swelling over the right inguinal region. Discolouration / Scar marks: Absent, Scar marks : Absent on right inguinal region

On Palpation- Tenderness: Present, Temperature: Normal, Size – 3 cm. Shape: oval, Fluctuation test : Negative

Specific examinations of inguinal hernia - Internal ring occlusion test: Positive, Ring invagination test(After occluding the deep ring): Negative, Zieman's test: Positive impulse on Index finger.

Investigations (26/06/2023) – Picture 1



SIDDHI PATHOLOGY LABORATORY

A/312, Tirthraj Complex, Nr. Nami Hotel, Opp. V.S. Hospital, Madalpur Road, Ellisbridge, Ahmedabad - 380 006.
(L) 26583188, 26585188 (M) 98250 50154
siddhipathlab@gmail.com
Time : Mon to Sat 8.00a.m. Sun 9.00 am to 1.00 pm.

Patient's Name [redacted] Age : 62 Years
Referred by :C/o. Akhandanand Hospi. Sex : Male
Date :26/06/2023 Ref. No. : 30926

REPORT OF BIOCHEMISTRY

Test	Result	Unit	Normal Value
Blood Sugar (R)	102.5	mg/dl	(80 - 120 mg/dl)
Urine Sugar (R)	Nil		
S. Creatinine	1.10	mg/dl	(0.7 - 1.3 mg/dl)
Bl.Urea	30.4	mg/dl	(17 - 43 mg/dl)
Total Billirubin	0.88	mg/dl	0.2-1.0mg/dl
Direct Billirubin	0.18	mg/dl	0.2-0.6mg/dl
Indirect Billirubin	0.70	mg/dl	0.2-0.6 mg/dl
SGPT	27.9	U/L	(5 - 40 u/l)

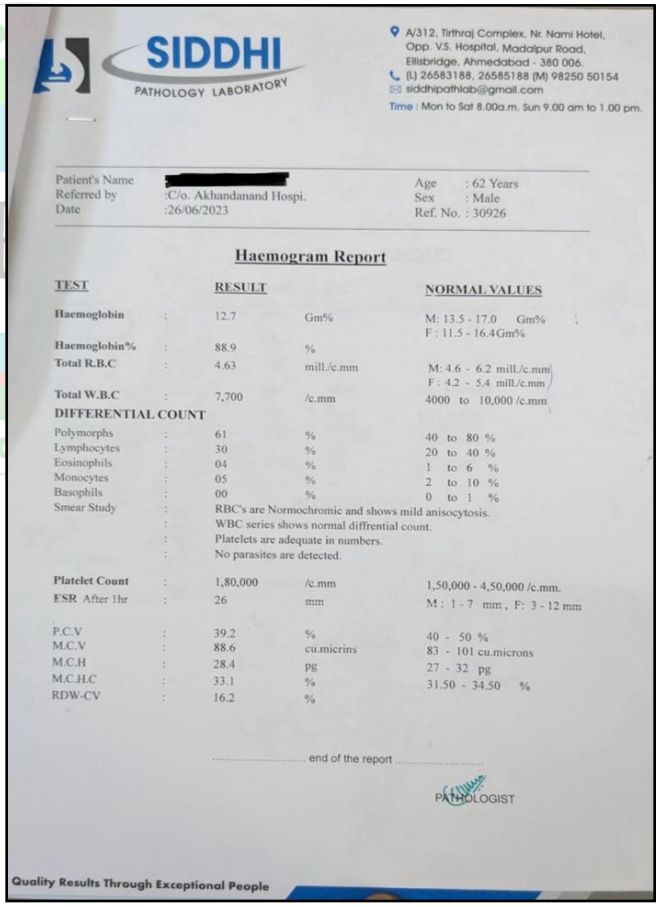
BLOOD GROUP

ABO Group : "O"
Rh. Group : "POSITIVE"

end of the report

PATHOLOGIST

Quality Results Through Exceptional People



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Haemogram Report

TEST		RESULT		NORMAL VALUES
Haemoglobin	:	12.7	Gm%	M: 13.5 - 17.0 Gm% F : 11.5 - 16.4Gm%
Haemoglobin%	:	88.9	%	
Total R.B.C	:	4.63	mill./c.mm	M: 4.6 - 6.2 mill./c.mm F : 4.2 - 5.4 mill./c.mm
Total W.B.C	:	7,700	/c.mm	4000 to 10,000 /c.mm
DIFFERENTIAL COUNT				
Polymorphs	:	61	%	40 to 80 %
Lymphocytes	:	30	%	20 to 40 %
Eosinophils	:	04	%	1 to 6 %
Monocytes	:	05	%	2 to 10 %
Basophils	:	00	%	0 to 1 %
Smear Study	:	RBC's are Normochromic and shows mild anisocytosis. WBC series shows normal diffrential count. Platelets are adequate in numbers. No parasites are detected.		
Platelet Count	:	1,80,000	/c.mm	1,50,000 - 4,50,000 /c.mm.
ESR After 1hr	:	26	mm	M : 1 - 7 mm , F: 3 - 12 mm
P.C.V	:	39.2	%	40 - 50 %
M.C.V	:	88.6	cu.microns	83 - 101 cu.microns
M.C.H	:	28.4	pg	27 - 32 pg
M.C.H.C	:	33.1	%	31.50 - 34.50 %
RDW-CV	:	16.2	%	

end of the report

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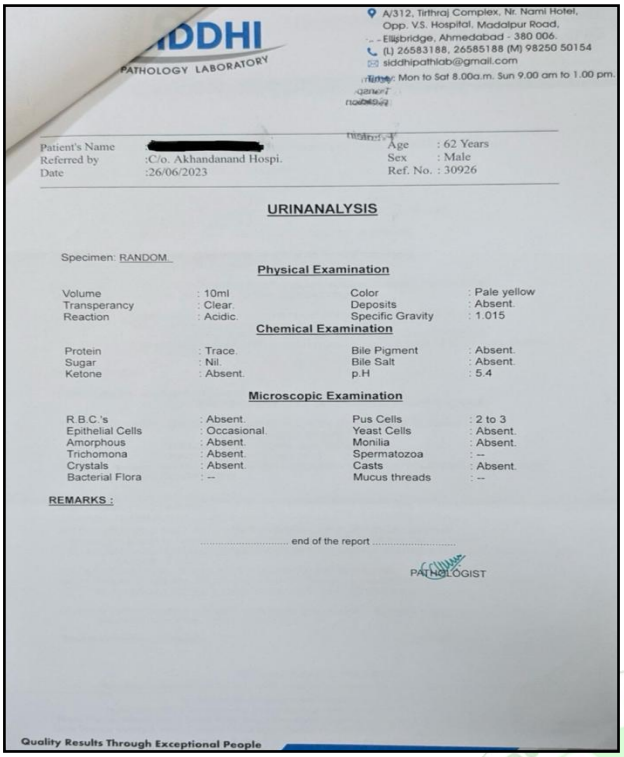
Quality Results Through Exceptional People

HB % :12.7gm/dL , WBC (TC) : 7700 Cells/Cumm , DC : N – 61% , L – 30% , E – 04% , M – 05% , ESR : 26mm 1st hour, HIV : Negative, HBsAg : Negative, Urine Albumin : Trace, Urine Sugar : Nil, Pus Cells : 2 – 3 RBS : 102.5 mg / dL , Urea : 30.4 mg / dL , Creatinine : 1.10 mg / dL , Platelet Count : 1.80 Lakhs / Cumm BT : 2.45 min , CT : 6.00 min , Blood Group : O positive



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URINANALYSIS

Specimen: RANDOM

Physical Examination

Volume	: 10ml	Color	: Pale yellow
Transperancy	: Clear.	Deposits	: Absent.
Reaction	: Acidic.	Specific Gravity	: 1.015

Chemical Examination

Protein	: Trace.	Bile Pigment	: Absent.
Sugar	: Nil.	Bile Salt	: Absent.
Ketone	: Absent.	p.H	: 5.4

Microscopic Examination

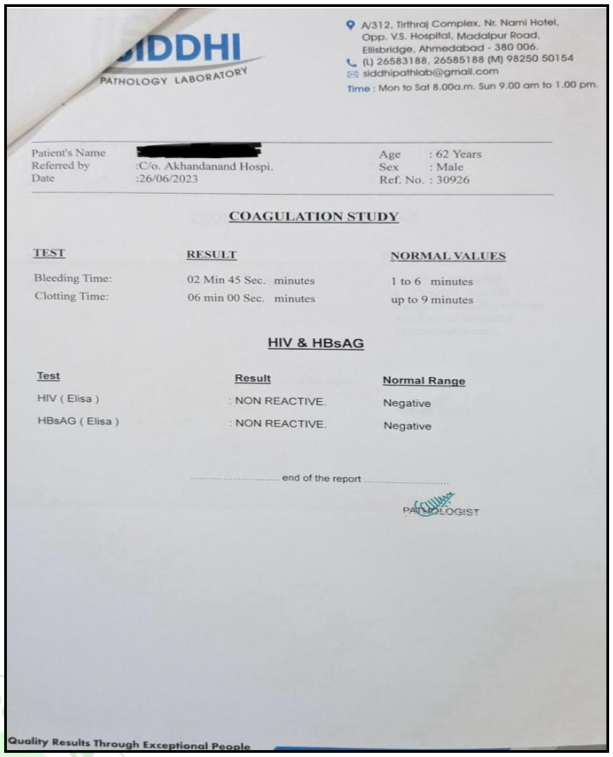
R.B.C.'s	: Absent.	Pus Cells	: 2 to 3
Epithelial Cells	: Occasional.	Yeast Cells	: Absent.
Amorphous	: Absent.	Monilia	: Absent.
Trichomona	: Absent.	Spermatozoa	: --
Crystals	: Absent.	Casts	: Absent.
Bacterial Flora	: --	Mucus threads	: --

REMARKS :

..... end of the report .....

PATHOLOGIST

Quality Results Through Exceptional People



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Date :26/06/2023 Ref. No. : 30926

COAGULATION STUDY

TEST	RESULT	NORMAL VALUES
Bleeding Time:	02 Min 45 Sec. minutes	1 to 6 minutes
Clotting Time:	06 min 00 Sec. minutes	up to 9 minutes

HIV & HBsAG

Test	Result	Normal Range
HIV (Elisa)	: NON REACTIVE.	Negative
HBsAG (Elisa)	: NON REACTIVE.	Negative

..... end of the report .....

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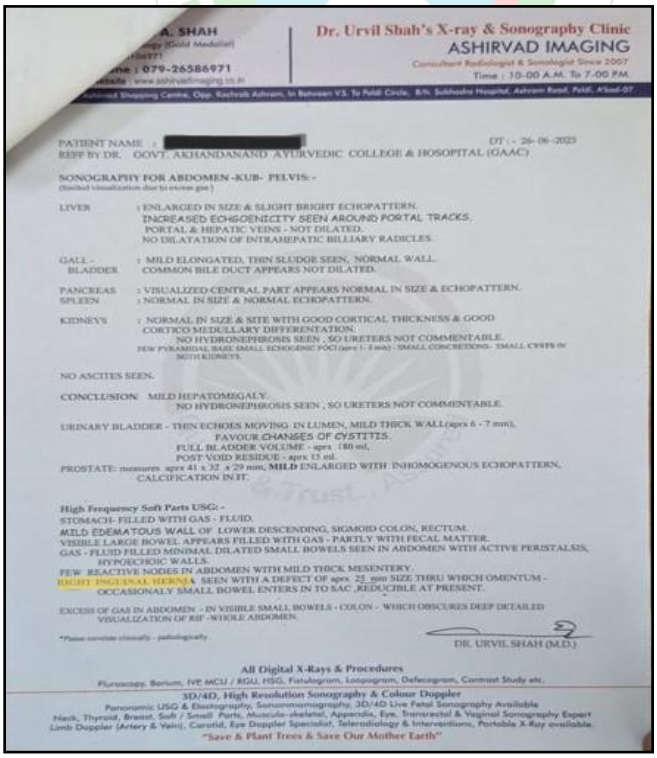
Quality Results Through Exceptional People

USG Abdomen & Pelvis: (26/06/2023) - Picture 2

Impression: Mild hepatomegaly seen. Mild enlargement of Prostate seen. Mild edematous wall of lower descending, sigmoid colon, Rectum. Right Inguinal Hernia seen with defect of aprox 25mm size through which omentum, occasionally small bowel enters into sac, reducible at present.



A. SHAH

Dr. Urvil Shah's X-ray & Sonography Clinic
ASHIRVAD IMAGING
Consultant Radiologist & Sonologist Since 2007
Time : 10-00 A.M. To 7-00 P.M.

PATIENT NAME : [redacted] DT : - 26- 06 -2023
REFF BY DR. GOVT. AKHANDANAND AYURVEDIC COLLEGE & HOSOPITAL (GAAC)

SONOGRAPHY FOR ABDOMEN -KUB- PELVIS: -

LIVER : ENLARGED IN SIZE & SLIGHT BRIGHT ECHOPATTERN.
INCREASED ECHGOENICITY SEEN AROUND PORTAL TRACKS.
PORTAL & HEPATIC VEINS - NOT DILATED.
NO DILATATION OF INTRAHEPATIC BILLIARY RADICLES.

GALL - BLADDER : MILD ELONGATED, THIN SLUDGE SEEN, NORMAL WALL.
COMMON BILE DUCT APPEARS NOT DILATED.

PANCREAS : VISUALIZED CENTRAL PART APPEARS NORMAL IN SIZE & ECHOPATTERN.
SPLEEN : NORMAL IN SIZE & NORMAL ECHOPATTERN.

KIDNEYS : NORMAL IN SIZE & SITE WITH GOOD CORTICAL THICKNESS & GOOD CORTICO MEDULLARY DIFFERENTATION.
NO HYDRONEPHROSIS SEEN , SO URETERS NOT COMMENTABLE.
FEW PYRAMIDAL BASE SMALL ECHOGENIC FOCI (aprx 1- 2 mm) - SMALL CONCRETIONS- SMALL CYSTS IN BOTH KIDNEYS.

NO ASCITES SEEN.

CONCLUSION: MILD HEPATOMEGALY.
NO HYDRONEPHROSIS SEEN , SO URETERS NOT COMMENTABLE.

URINARY BLADDER - THIN ECHOES MOVING IN LUMEN, MILD THICK WALL(aprx 6 - 7 mm).
FAVOUR CHANGES OF CYSTITIS.
FULL BLADDER VOLUME - aprx 180 ml.
POST VOID RESIDUE - aprx 15 ml.

PROSTATE: measures aprx 41 x 32 x 29 mm, MILD ENLARGED WITH INHOMOGENOUS ECHOPATTERN, CALCIFICATION IN IT.

High Frequency Soft Parts USG: -
STOMACH- FILLED WITH GAS - FLUID.
MILD EDEMATOUS WALL OF LOWER DESCENDING, SIGMOID COLON, RECTUM.
VISIBLE LARGE BOWEL APPEARS FILLED WITH GAS - PARTLY WITH FECAL MATTER.
GAS - FLUID FILLED MINIMAL DILATED SMALL BOWELS SEEN IN ABDOMEN WITH ACTIVE PERISTALSIS, HYPOCHOIC WALLS.
FEW REACTIVE NODES IN ABDOMEN WITH MILD THICK MESENTERY.
RIGHT INGUINAL HERNIA SEEN WITH A DEFECT OF aprx 25 mm SIZE THRU WHICH OMENTUM - OCCASIONALY SMALL BOWEL ENTERS IN TO SAC ,REDUCIBLE AT PRESENT.

EXCESS OF GAS IN ABDOMEN - IN VISIBLE SMALL BOWELS - COLON - WHICH OBSCURES DEEP DETAILED VISUALIZATION OF RIF -WHOLE ABDOMEN.

*Please correlate clinically - pathologically

DR. URVIL SHAH (M.D.)

All Digital X-Rays & Procedures
Fluroscopy, Barium, IVP, MCU / RGU, HSG, Fistulogram, Loopogram, Defecogram, Contrast Study etc.
3D/4D, High Resolution Sonography & Colour Doppler
Panoramic USG & Elastography, Sonommamography, 3D/4D Live Fetal Sonography Available
Neck, Thyroid, Breast, Soft / Small Parts, Musculo-skeletal, Appendix, Eye, Transrectal & Vaginal Sonography Expert
Limb Doppler (Artery & Vein), Carotid, Eye Doppler Specialist, Teleradiology & Interventions, Portable X-Ray available.
"Save & Plant Trees & Save Our Mother Earth"

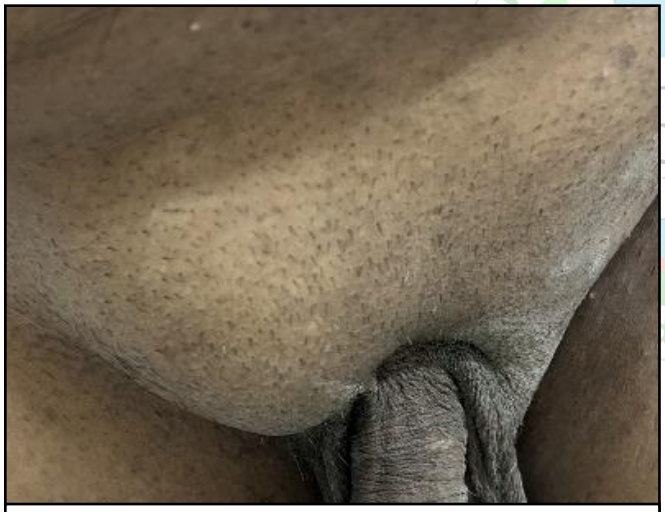
Treatment/Operative Procedure

Pre-operative

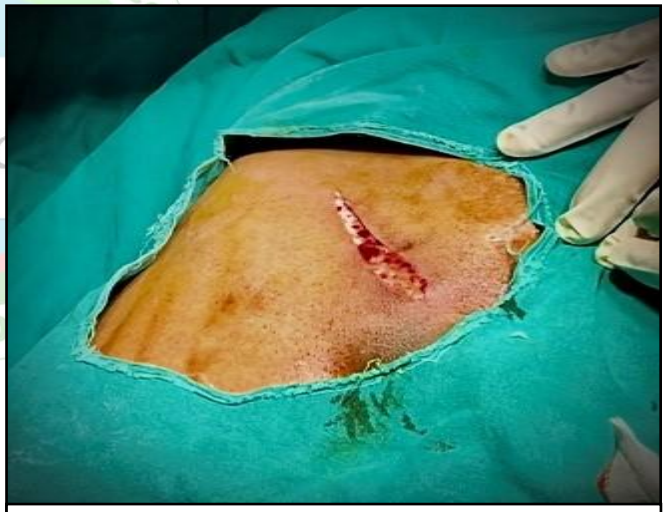
- Consent for both surgery & anaesthesia taken
- Fitness for surgery taken from physician
- Nipple to Knee area shaved & washed with Betadine Surgical scrub 7.5%solution
- Patient was kept NBM, 6 hours prior to surgery
- Inj T.T 0.5cc /IM/stat & Inj. Xylocaine 0.3cc/SC/stat as test dose given
- Bowels cleared by giving enema 4 hours before surgery

Operative

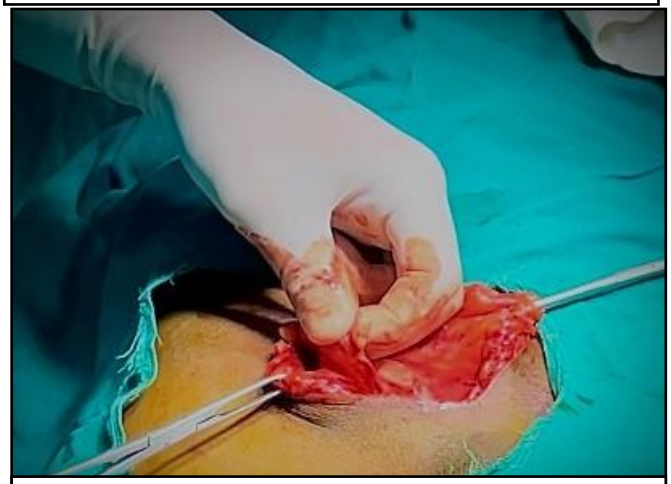
Painting & draping has been done to the patient, after that skin is incised 1.25 cm above and parallel to the inguinal ligament. Superficial fascia is incised. Superficial pudendal and superficial epigastric vessels are cauterised. For retracting the skin edgesC - Retractor is placed. External oblique aponeurosis is incised parallel to the line of skin incision. Incision is extended on either ends of the incision; medially it is extended toward superficial ring. Upper leaf is reflected above with artery forcep; conjoined tendon and lateral rectus sheath has been examined after using peanut dissection. Lower leaf is reflected downwards to visualise and expose the inguinal ligament. Dissection done of entire inguinal ligament and exposed with its edge and iliopubic tract. Iliioinguinal nerve is preserved. Cremasteric muscle with its fascia is opened and made medial and lateral flaps. Cord structures are dissected. Dissection is started from the fundus and extended towards the neck.Sac is opened at the fundus. Finger is passed to release any adhesions. Sac is twisted so has to prevent the content from coming back. It is transfixed using absorbable suture material vicryl 2-0 and is excised distally. After herniotomy suitable sized mesh is selected. Mesh is placed deep to the cord structures;Below it is sutured to the inguinal ligament using continuous non-absorbable poly- propylene sutures; Medially it is overlaped 2 cm over the pubic tubercle, Laterally at the level of internal ring. Mesh on its lateral part is slit onto two tails; 2/3rd upper leaf and 1/3rd lower leaf ,Slit is done up to the internal ring and cord with ilioinguinal nerve is passed in between the tails; upper leaf is overlapped onto the lower leaf in front below and is sutured to inguinal ligament at the level of internal ring. Laterally both leaflets are spread up to anterior superior iliac spine for 6 cm above and medially mesh is fixed to conjoint tendon using interrupted poly-propylenesutures. Cord is placed on the mesh. External oblique is sutured using same absorbable suture material. Subcutaneous tissue and skin is closed.



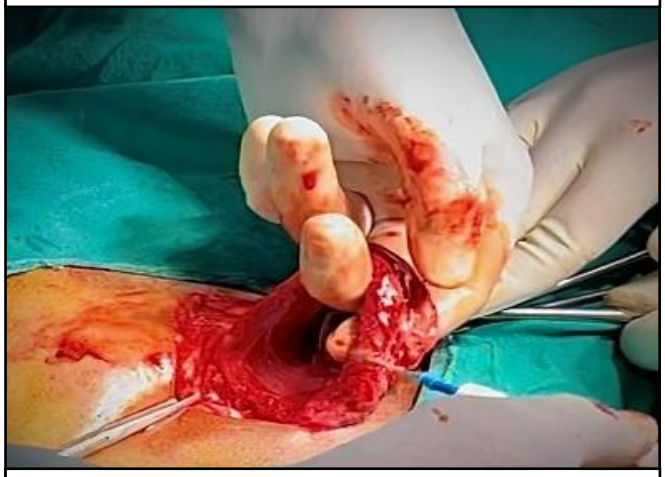
1.Before Operation



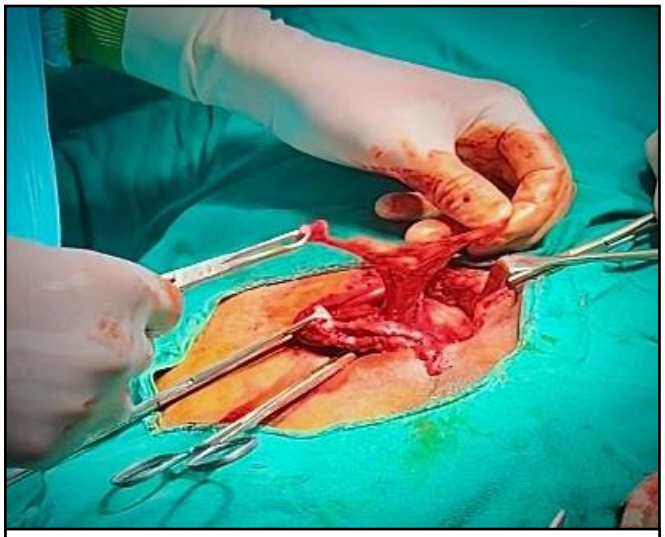
2. Incision above Inguinal Ligament



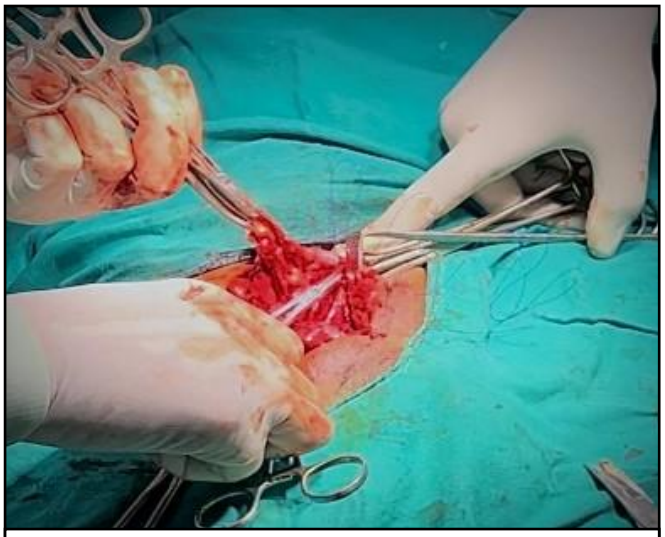
3. Opening of Layers



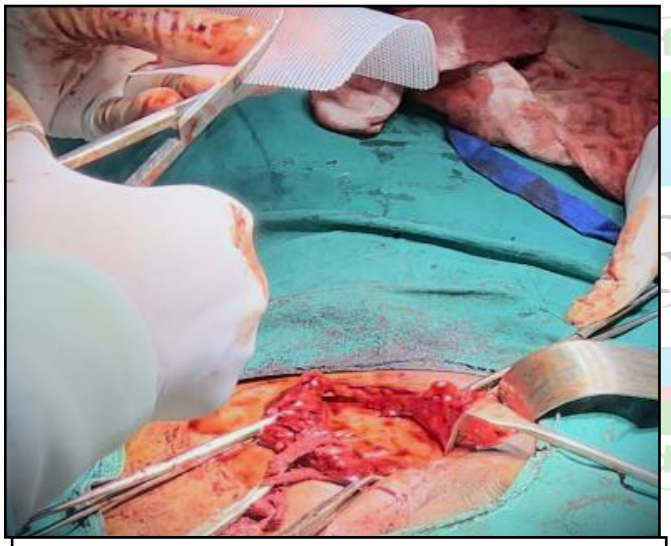
4. Gentle dissection of Cord



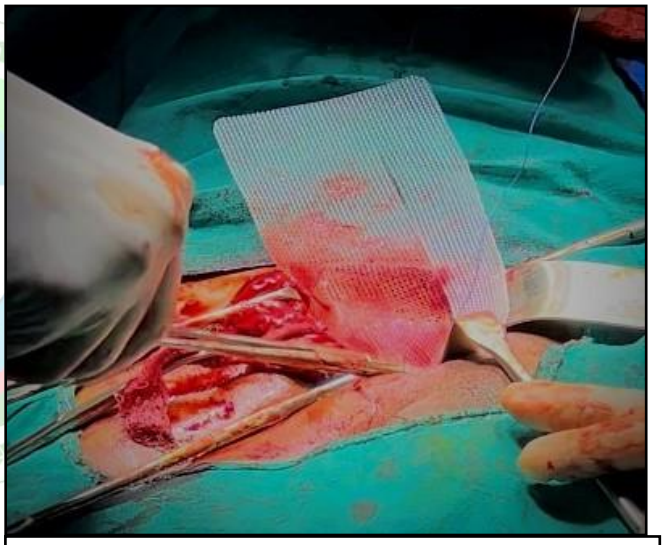
5. Opening of Sac at the Fundus



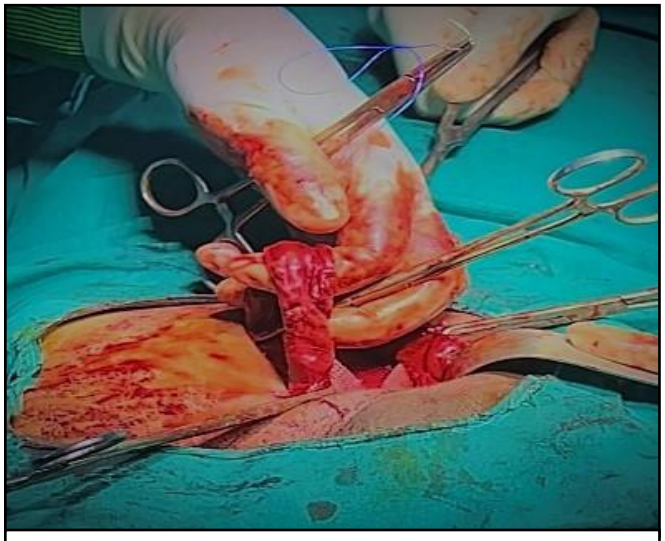
6. Transfixation of the Sac



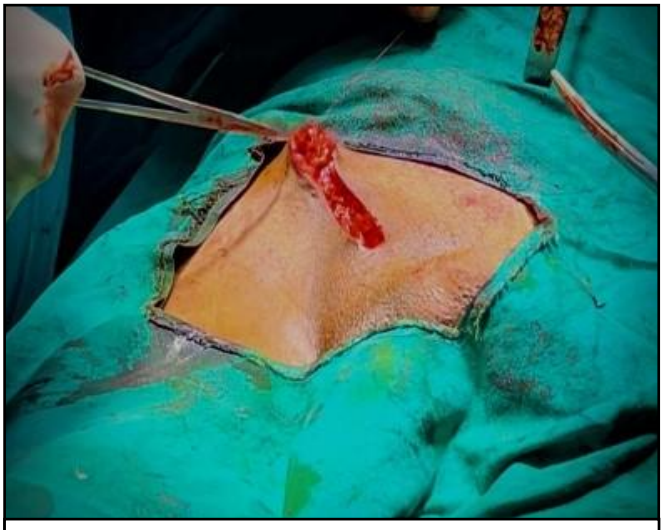
7. Prepare appropriate size of Mesh



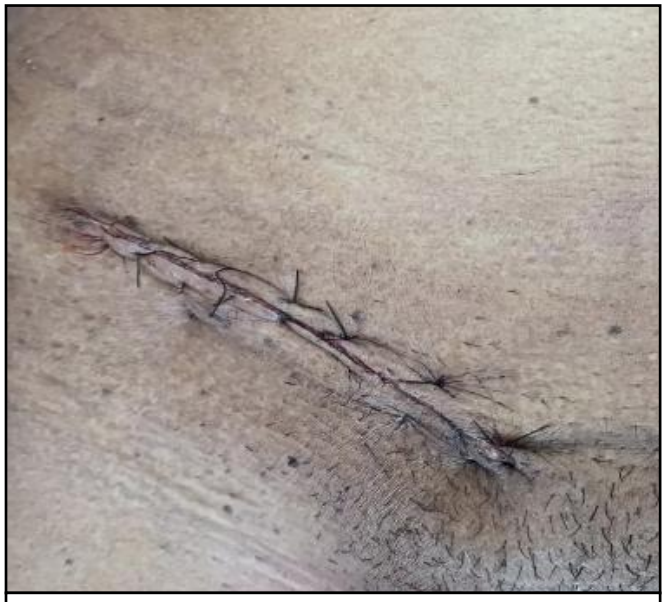
8. Placement of Mesh deep to the cord



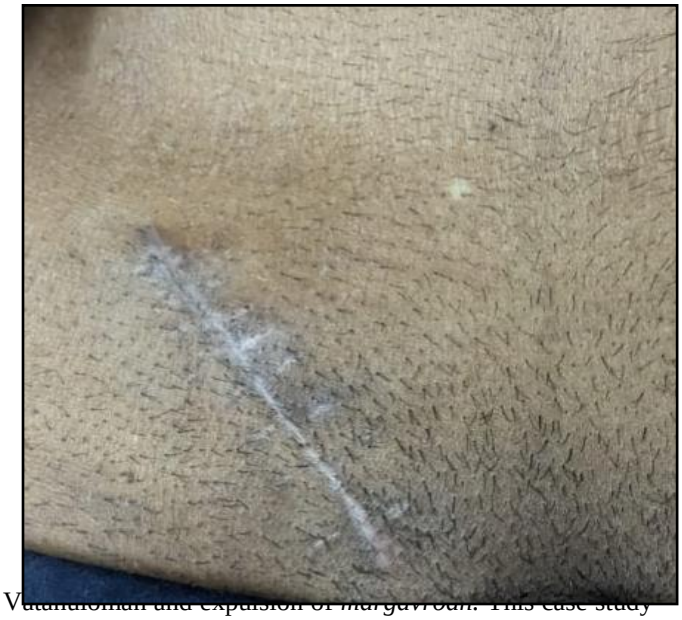
9. Placement of cord above the Mesh



10. Closing Layer by Layer



11. After operation – On Table



12. After 14 days of operation

Post-operative

- Foley's catheterisation done to ease the patient.
- NBM to be continued for another 4 hours post operatively & then relieved by giving sips of water
- Followed by soft diet.
- Inj. Monocef 1gm IV/ 12th hourly for 3 days &Inj. Tramadol 2ml/ IM sos for 3 days, Under the advice of consultant physician
- Advised alternate day dressing.
- Discharged after 48 hours of surgery.
- Sutures removed on 14th day after surgery.

RESULTS & DISCUSSION

Hernias develop when weaknesses or openings occur in the muscular walls or tissues responsible for holding organs in place. These weaknesses permit organs or tissues to protrude, resulting in a hernia. Factors such as increased intra-abdominal pressure, chronic constipation, straining, and age significantly contribute to the onset of hernias. These factors exacerbate *vayu*, which is according to Ayurvedic literature identifies as the primary cause of inguinal hernias. When the vitiated *vata dosha* localizes in the inguinal region, it leads to swelling and discomfort, eventually progressing to a dragging type of pain.Hernioplasty, performed by surgeons, involves repositioning the organ to achieve anatomical correction. Post-surgery, patients may experience discomfort due to the mesh, and some may notice numbness, tingling sensations, or sensory disturbances[7]. Surgical complications such as infection, hematoma, and seroma may also arise, along with potential issues like mesh migration, shrinkage, or adhesion.While Ayurvedic texts offer limited elaboration on *Nitya virechana*, references can be found in texts like *Jalodara, kushtha, Gridhrasi,* and *Antravridhhi*.Following *Nitya virechana*, hernioplasty yields the outcomes of Vatanulomana and expulsion of *malapravrutti*. This case study demonstrates the effectiveness of hernioplasty with *nityavirechana* as a *purvakarma* in managing inguinal hernias, with no risk of the complications mentioned above.

CONCLUSION

Surgery is typically the recommended treatment for inguinal hernias. However, asymptomatic patients with inguinal hernias can choose to defer surgical intervention. Acharya Sushruta provided detailed explanations of the *Nidana*, *Samprapti*, and *Chikitsa* of inguinal hernias under the topic *Antravriddhi* Ayurvedic treatments can alleviate symptoms of *Antravridhhi* to some extent; however, surgery remains the final option to correct anatomical disturbances. According to Acharya Sushruta, a case of inguinal hernia extending down to the scrotal sac is deemed irremediable. Nevertheless, in modern times, surgeons utilize various procedures such as herniotomy, herniorrhaphy, hernioplasty, and laparoscopic hernia repair, employing advanced instruments and techniques.

REFERENCES

1. Shastri Ambikadutt: Editor, Arshanidana Adhyaya: Chapter 12 Nidanasthan., Sushruta Samhita by
2. Maharishi Sushruta with Ayurveda Tattva Sandipika Commentary by, Chaukhambha Sanskrit
3. Sansthan., Oriental Publishers and Distributors, Ed. 1, New Delhi Reprint 2023 Vol. I , pg no. 358
4. Shastri Ambikadutt: Editor, Vridhhiupadanshashlipada chikitsa Adhyaya: Chapter 19
5. Chikitsasthan., Sushruta Samhita by Maharishi Sushruta with Ayurveda Tattva Sandipika
6. Commentary by, Chaukhambha Sanskrit Sansthan., Oriental Publishers and Distributors, Ed. 1, New
7. Delhi Reprint 2023 Vol. I , pg no. 112
8. Sriram Bhatt M. Editor ,Hernia chapter -18 , SRB's Manual of Surgery , Jaypee publishers , 5th

9. Edition , New Delhi , Pg no- 747
10. Proff. Sir Norman Willimas , Proff. P.Ronan O'Connell , Proff. Andrew W. McCaskle ; Editor ,
11. Part 11 , Abdominal wall, Hernia chapter by Bruce Tulloh & Stephen J. Nixon , Bailey & Love's
12. Short practice of surgery , CRC Press Taylor & Francis Group, Ed. 27- New York , Pg no. 1023
13. Shastri Ambikadutt: Editor, Vridhhiupadanshashlipada nidana Adhyaya: Chapter 12 Nidanasthan.,
14. Sushruta Samhita by Maharishi Sushruta with Ayurveda Tattva Sandipika Commentary by,
15. Chaukhambha Sanskrit Sansthan., Oriental Publishers and Distributors, Ed. 1, New Delhi Reprint
16. 2023 Vol. I , pg no. 356
17. Shastri Ambikadutt: Editor, Vridhhiupadanshashlipada chikitsa Adhyaya: Chapter 19
18. Chikitsasthan., Sushruta Samhita by Maharishi Sushruta with Ayurveda Tattva Sandipika
19. Commentary by, Chaukhambha Sanskrit Sansthan., Oriental Publishers and Distributors, Ed. 1, New
20. Delhi Reprint 2023 Vol. I , pg no. 112
21. Proff. Sir Norman Willimas , Proff. P.Ronan O'Connell , Proff. Andrew W. McCaskle ; Editor ,
22. Part 11 , Abdominal wall, Hernia chapter by Bruce Tulloh & Stephen J. Nixon , Bailey & Love's
23. Short practice of surgery , CRC Press Taylor & Francis Group, Ed. 27- New York , Pg no. 1023.