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# Post-operative Management of inguinal hernia by using Ayurveda Formulation: A Case Report

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**ABSTRACT:**

Inguinal hernia is a common surgical condition, and more than 20 million patients are being repaired globally each year. Inguinal hernias account for 75% of all abdominal wall hernias. Inguinal hernia surgery belongs to the class of 'clean" surgery and requires a single-dose prophylactic antibiotic as per recommendation of Hernia Society. The rate of surgical site infection (SSI) following hernia repair reported in the international literature ranges between 0% and 14%. A 40 years old male a tailor by occupation non hypertensive and non-diabetic patient diagnosed as Right side indirect inguinal hernia was selected. After pre anesthesia checkup, open inguinal hernia was repaired with the Lichtenstein procedure. *Ayurveda* formulation three capsules twice daily was given at night before surgery, morning on the day of surgery with sips of water, and continued for 5 days in the postoperative period. The sutures removed on the 10$^{th}$ day. ASEPSIS wound score and SOUTHMPTON wound healing grading system were used for assessment. The postoperative recovery was uneventful. Surgical site infection and mesh rejection was not found in long-term six months follow-up. In this case the ASEPSIS wound score was found to be 0 and the SOUTHMPTON wound healing grading system remained grade 0 even after 30 days of open inguinal hernia repair. Successful outcome of *Ayurveda* formulation in prevention of surgical site infection in open inguinal hernia repair is a new gateway for Ayurveda surgeons. Surgery can be performed in Ayurveda institutions without antibiotics in the pre- and post-operative period.

**KEYWORDS**: *Ayurveda* Compound, Hernioplasty, Inguinal hernia, Lichtenstein procedure.

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## INTRODUCTION:

Inguinal hernia repair is one of the most common surgical procedures performed globally [1], with an estimated 20 million cases annually [2, 3]. Inguinal hernias account for 75% of all abdominal wall hernias [4] with an occurrence of groin hernia is 27–43% in men and 3–6% in women [5]. Inguinal hernia surgery belongs to the class of 'clean" surgery and requires a single-dose prophylactic antibiotic as per recommendation of Indian Council of Medical Research (ICMR) and Hernia Society guideline [6,7]. Surgical site infections (SSIs) persist as a significant challenge in contemporary surgical practice, particularly in open inguinal hernia repair procedures. Despite advancements in surgical techniques, aseptic protocols, perioperative care, and instrument sterilization methods, SSIs are a common complication [8, 9]. The rate of surgical site infection (SSI) following hernia repair reported in the literature ranges between 0% and 14% [10]. There are multiple techniques for the prevention of SSI have been recommended including preoperative factors (showering with soap, antimicrobial prophylaxis), intraoperative factors (skin preparation with an alcohol-based antiseptic, normothermia, aseptic precautions), and postoperative factors (shortening duration procedure, avoiding use of drain, sterile regular dressings [11]. However, healing can be delayed when complications arise. Surgical site infection (SSI), defined as wound infections occurring within 30 days after surgery [12] is a potential complication experienced after surgery that results in poorer patient outcomes and increased costs [13]. The Centres for Disease Control (CDC), National Healthcare Safety Network (NHSN), and Surgical Site Infections (SSIs) are classified by the depth and tissue involved a superficial SSI that involves only the skin or subcutaneous tissue, a deep incisional SSI involves the fascia and /or muscular layers and an organ space SSI involves any part of the body opened or manipulated during a procedure [14]. As antimicrobial resistance becomes an increasingly pressing concern, there is a growing need for alternative approaches to infection prevention and management. Ayurveda, the traditional system of medicine originating in India and rich repository of herbal or herbo-mineral formulations with potential antimicrobial and wound-healing properties [15]. The description of Herbo-mineral drugs is mentioned in different context for management of *Shastrapada* (Surgical wound). In *Ayurveda* antimicrobial concept, Acharya Sushruta has given the concept of *Rakshakarma* (Asepsis)[16] to protect and prevent infection to wounded patient from *Nishachara* [17] (~microbes). It is done by using *Krimighna* (anti-helminthic) drugs and keeping cleaning of *Vranitagara* (wounded room) [18] by using fumigation of *Dhopan drvya*. [19,20]. This concept is similar with practice of aseptic surgical technique. The ancient surgeon *Sushruta* has been described the *Samprapti* [21] (pathogenesis) and *Chikitsa* [22]. (surgical procedure) for *Antravriddhi* (Inguinal hernia). His surgical management principles incorporated *Seevana*[23] (suturing techniques) and *Sandhana Karma* [24] (tissue approximation procedure). Contemporary hernia repair similar with these classical *Seevana* and *Sandhana Karma* techniques described in ancient *Ayurveda* surgical texts.

First time at AIIA, New Delhi has taken up the challengeable task to conduct the inguinal hernia surgery without any antibiotic prophylaxis. In present case report, the patient was diagnosed as case of *Dakshina Vankshana Antravridhi* (~Right sided Inguinal Hernia) and Lichtenstein procedure was done. In this patient no antibiotic was administered any time in pre

and post-operative period. In six months follow-up no evidence of surgical site infection or mesh rejection were documented.

## PATIENT INFORMATION:

A 40 years old male a tailor by occupation non hypertensive and non-diabetic patient presented with complaints of swelling in right groin for last 2 months and no pain over swelling. The swelling appeared insidiously, initially swelling was in the groin and gradually increased in size. The swelling disappears when the patient lies down, but the swelling reappears on standing and on walking, coughing and straining. There is no history of cough, breathlessness, chronic constipation, difficulty in micturition. He had history of smoking for last 10 years. He had no history of alcohol, previous surgery, drug allergy, tuberculosis, bronchial asthma, epilepsy, other systemic disease or illness.

### Clinical Findings:

On examination, the general condition including body built, nutrition and vitals were found normal. Pallor, icterus, cyanosis, clubbing and edema were absent. On Local examination: Swelling at right inguinal region [Figure:1] and swelling does not extended the beyond superficial ring, size 3x 2cm and pyriform in shape, skin over swelling-normal and no any scar/sinus/dilated vein/pigmentation visible over swelling, no visible peristalsis and expansile cough impulse was visible. Swelling was completely reduced spontaneously on lying position and swelling reappear on standing and coughing. On Palpation, Temperature over the swelling was normal, no tenderness. The swelling was soft and situated above and medial to the pubic tubercle. On deep ring occlusion test, the swelling was not appeared and impulse felt at the tip of finger. Right testis separated from the swelling and palpable. Left inguinal region, left spermatic cord, left testis were normal. USG finding 1.1 cm defect noted in right inguinal region through which omental fat and bowel loops are seen herniating.

### Diagnostic focus and Assessment:

On the basis of history and clinical examination, the case was diagnosed as *Dakshina Vankshana Antravridhi (*~Right sided uncomplicated reducible, Inguinal hernia). Surgical profile including complete Haemogram, bleeding time, clotting time, Prothrombin Time International Normalized Ration (PT-INR), Renal Function Test (RFT), Liver Function Test (LFT), Blood sugar HIV and Hepatitis B-virus (HBsAg), Hepatitis C-virus (HCV), Chest X-ray and Electro Cardiogram (ECG) were done. The Ultrasonography suggested of right sided inguinal hernia. Postsurgical assessment was done by the ASEPSIS scoring system [25] and SOUTHAMPTOM wound grading system [26] on 5$^{th}$ days, 10th days and 30$^{th}$ days after surgery. Surgical site infection was assessed as per CDC guideline. [27]

## THERAPEUTIC INTERVENTION:

After written informed consent and pre anesthetic checkup, the patient was posted for Right sided Hernioplasty [Figure:2-6]. The day before the surgery, *Ayurveda* formulation (herbo-mineral formulation-coded AA-1) was started as prophylactic. On the day of surgery, the medicine was given 4 hours prior to surgery with sips of water. After that hernioplasty was done under spinal anesthesia. Patient was managed post operatively with intravenous fluid [(Ringer Lactate (RL) and Dextrose Normal Saline (DNS)] and analgesic (Diclofenic sodium) and *Ayurveda*

compound AA-1 at night on the day of surgery and continued for 5 days twice daily.

**TIMELINE-** Timeline of the case is given in Table No.1

**OUTCOME AND FOLLOW UP:**

The surgical site was evaluated by using two standardized assessment tools ASEPSIS wound scoring system and Southampton wound grading system on day 5th, day 10th, and day 30th. There was no serous discharge, Erythema, Purulent exudate, Separation of deep tissues at surgical site on 5th days, 10th days and 30th days (Figure- 7-9). Overall the score was within 0–10 (Table-2). It showed the satisfactory healing of surgical site. According to the Southampton wound grading system, grading of the surgical site was zero, means normal healing (Table-3). The sutures were removed on 10th post-operative day and showd no any gapping of infection or collection of pus. Follow-up on 30th days revealed a well healed surgical scar with, no serous or purulent discharge or erythema or separation of deep tissue. Long-term follow-up were conducted at one month and six months post-operatively. The one-month follow up confirmed the no evidence of surgical site infection as per Centers for Disease Control and Prevention (CDC) criteria. The six-month follow-up no any complication or mesh rejection were documented [Figure:10].

**Table-1: Timeline:**

| Date | Observation/clinical findings | Therapeutic intervention |
|---|---|---|
| 24.08.2024 | • Case diagnosed Right sided inguinal hernia | - |
| 31.08.2024 | • Surgical profile/investigation were done | - |
| 31.08.2024 | • Pre-anaesthesia check-up was done | - |
| 05.09.2024 | • Patient was admitted | Three capsule (1435mg) given in evening with luke warm water after food |
| 06.09.2024 | • Right hernioplasty done under spinal anaesthesia | Intravenous fluids and analgesics given as per requirement.<br>Ayurveda Medicine was started in evening with luke warm water. |
| 07.09.2024 to 11.09.2024 | • Patients no complaints of pain at operated site, swelling, fever, breathlessness and cough.<br>• No scrotal swelling was noted<br>• No Abdomen distended<br>• Abdomen soft and non-tender | Ayurveda Medicine was continued for 5 days with luke warm after food. |
| 11.09.2024 | • No swelling, no pus/serous discharge, no erythema, was seen at surgical site<br>• Skin edges well approximated and no necrosis seen in the skin flap.<br>• No scrotal swelling | Surgical site cleaned with betadine and sterile dressing done. - |

| | | |
|---|---|---|
| 16.09.2024 | • No swelling, no pus/serous discharge, no erythema, was seen at surgical site<br>• Skin edges well approximated.<br>• Suture line healthy<br>• No scrotal swelling | In all aseptic precaution all suture were removed. |
| 06.10.2024 | • Surgical scar was healthy<br>• Wound completely healed<br>• No swelling, no discharge was present<br>• No scrotal swelling<br>• Bilateral testis normal<br>• No evidence of surgical site infection was noted | - |
| 06.03.2025 | • Surgical scar was healthy<br>• Wound completely healed<br>• No swelling, no discharge was present<br>• No scrotal swelling<br>• Bilateral testis normal<br>• No evidence of surgical site infection noted or mesh rejection were noted<br>• No complications were reported | - |

**Table-2: Assessment Criteria: Asepsis Wound Score:**

| **Criterion** | **Points** | **Post-operative 5th day** | **Post-operative 10th day** | **Post-operative 30th day** |
|---|---|---|---|---|
| (Additional treatment :) | | 0 | 0 | 0 |
| Antibiotics | 10 | | | |
| Drainage of pus under local anesthesia | 05 | 0 | 0 | 0 |
| Debridement of wound (general anesthesia) | 10 | 0 | 0 | 0 |
| Serous discharge | Daily 0-5 | 0 | 0 | 0 |
| Erythema | Daily 0-5 | 0 | 0 | 0 |
| Purulent exudate | Daily 0-5 | 0 | 0 | 0 |
| Separation of deep tissues | Daily 0-5 | 0 | 0 | 0 |
| Isolation of bacteria | 10 | 0 | 0 | 0 |
| Stay as inpatient prolonged over 14 days | 05 | 0 | 0 | 0 |

| | Proportion of wound affected | | | | | |
|---|---|---|---|---|---|---|
| Wound characteristic | 0 | <20 | 20-39 | 40-59 | 60-79 | >80 |
| Serous discharge | 0 | 1 | 2 | 3 | 4 | 5 |
| Erythema | 0 | 1 | 2 | 3 | 4 | 5 |
| Purulent exudate | 0 | 2 | 4 | 6 | 8 | 10 |
| Separation of deep tissues | 0 | 2 | 4 | 6 | 8 | 10 |

The category of infection was determined as:

0–10 - Satisfactory healing

11–20 - Disturbance of healing

21–30 - Minor wound healing

31–40 - Moderate wound infection.

Scores >40- would be indicated as severe wound infection

**Table: 3: SOUTHAMPTOM Wound Grading System:**

| **Grade** | **Appearance** | **Post-operative 5th day** | **Post-operative 10th day** | **Post-operative 30th day** |
|---|---|---|---|---|
| 0- Normal healing | | YES | YES | YES |
| I -Normal healing with mild bruising or erythema | A—some bruising<br>B—considerable bruising<br>C—mild erythema | NO | NO | NO |
| II -Erythema plus other signs of inflammation | A—at one point<br>B—around sutures<br>C—along wound<br>D—around wound | NO | NO | NO |
| III- Clear or haemo-serous discharge | A—at one point only (<2 cm)<br>B—along wound (>2 cm)<br>C—large volume<br>D—prolonged (>3 days) | NO | NO | NO |
| IV-Pus/purulent discharge | A—at one point only (<2 cm)<br>B—along wound (>2 cm) | NO | NO | NO |
| V -Deep or severe wound infection with or without tissue breakdown, hematoma requiring aspiration. | | NO | NO | NO |

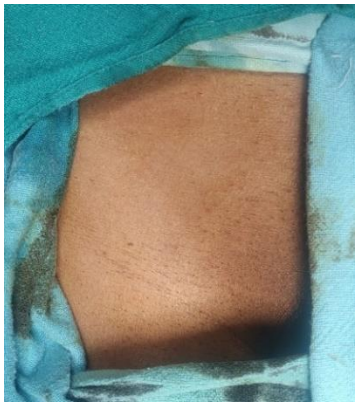

**Figure:1: Preoperative**

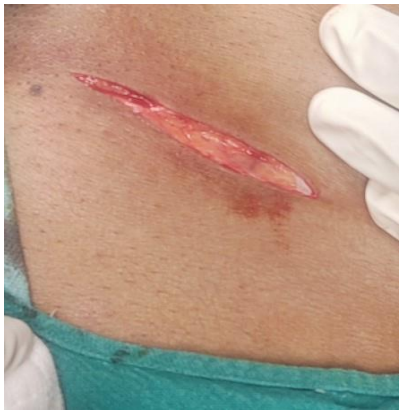

**Figure:2: Incision**

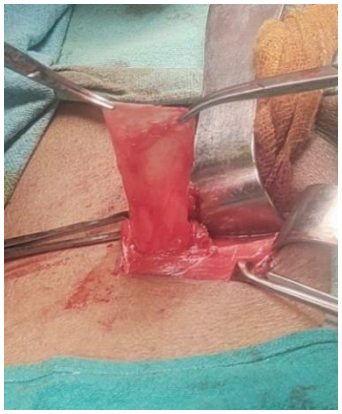

**Figure:3: Hernia sac**

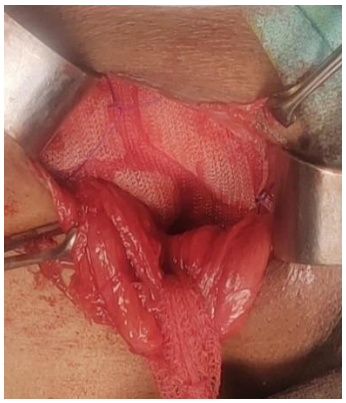

**Figure:4: Prolene mesh reinforcement**

**Figure:5: Closure of external oblique apponeurosis**

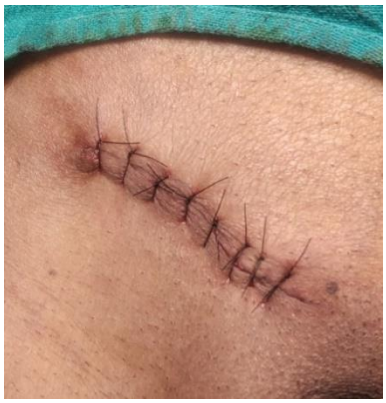

**Figure:6: Incision closure**

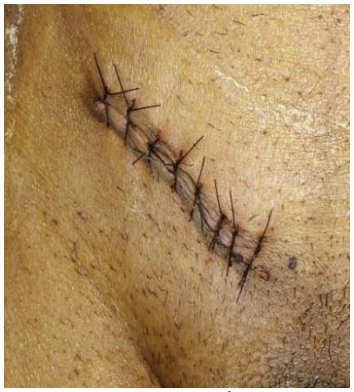

**Figure:7: 5th days**

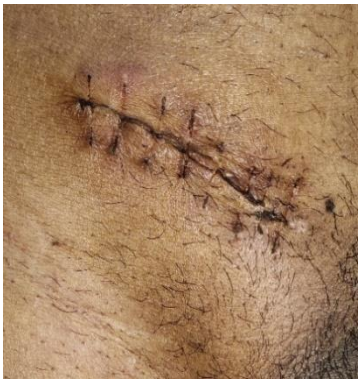

**Figure:8: 10th days : Sutured removed**

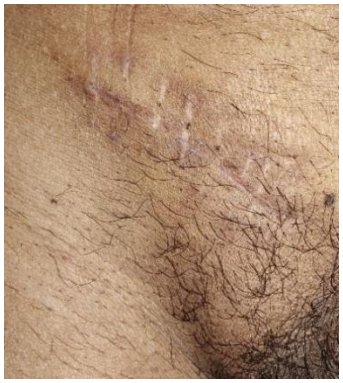

**Figure:9: 30th days**

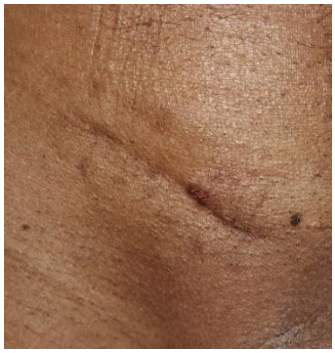

**Figure:10: After six months follow up**

**DISCUSSION:**

Surgical Site Infection (SSI) remains one of the most frequently encountered postoperative complications, posing significant challenges in both clinical outcomes and healthcare costs. While the administration of appropriate antibiotic prophylaxis tailored to specific surgical procedures has been the cornerstone in SSI prevention, the emergence of antimicrobial resistance has increasingly limited the effectiveness of these measures. [28] Inguinal hernia repair, categorized under clean surgical procedures, traditionally carries an infection rate of less than 5% [29]. Despite strict aseptic protocols, endogenous skin flora primarily Staphylococcus aureus, coagulase-negative Staphylococci, and Streptococcus species may still colonize surgical wounds [30,31]. Inappropriate selection, dosing, or timing of antibiotic prophylaxis can further compromise surgical outcomes and contribute to the global threat of antibiotic resistance. The World Health Organization (WHO), in 2019, underscored this concern by declaring antimicrobial resistance a global health emergency requiring urgent coordinated action.

*Acharya Sushruta* emphasized the significance of asepsis in surgical practice. The *Sushruta Samhita* details the necessity of maintaining a sterile environment to prevent contamination by *Nishachara (Microbes)* that conceptually aligns with microorganisms imperceptible to the naked eye and other pathogens attracted to the surgical field by the odour of blood. *Acharya Sushruta's Rakshakarma Vidhi*, a ritualistic protective invocation, was traditionally practiced, providing metaphysical safeguarding during surgery, reflecting a holistic approach to patient care.

Further, *Antravridhi* a condition comparable to hernia in modern medical terminology is described in *Ayurveda* with etiological factors such as lifting heavy weight, trauma, and falls, which are congruent with current biomechanical understandings of hernia formation. The predominance of *Vata Dosha* [32] in the pathogenesis of *Antravridhi* suggests that post-operative care should include measures to avoid aggravation of *Vata*, thereby preventing recurrence. The *Ashtavidha Shastra Karmas* [33], especially *Seevan Karma* (Suturing) and *Sandhana Karma* (tissue approximation), are directly applicable in the surgical correction of anatomical defects caused by hernia. These principles conceptually align with modern hernioplasty techniques used to restore tissue integrity.

In contemporary *Ayurvedic* surgical practice, the absence of parallel alternatives to modern antibiotics has made practitioners reliant on allopathic prophylaxis. Recognizing this gap, a *herbo-mineral* formulation was developed at the All India Institute of Ayurveda (AIIA), New Delhi. This formulation is believed to possess antimicrobial, immunomodulatory, and rejuvenative properties. Preclinical antimicrobial studies of this compound have demonstrated both bacteriostatic and bactericidal effects, notably against Staphylococcus aureus, Escherichia coli, Pseudomonas aeruginosa, Methicillin-resistant Staphylococcus aureus (MRSA), Aspergillus niger, and Candida albicans pathogens commonly associated with surgical wound infections.

In this case aimed to evaluate the efficacy of this *herbo-mineral* formulation as a prophylactic agent in open inguinal hernia mesh repair and exhibited uneventful wound healing with no signs of infection. Post-operative wounds were assessed using validated scoring systems ASEPSIS, the Southampton Wound Grading System and CDC guideline. The coded drug AA-1 formulation may be a promising adjunct to

conventional antibiotic prophylaxis, especially in clean surgeries like hernia repair. Its efficacy may be attributed to its *herbo- mineral* components, which act synergistically to inhibit microbial growth, enhance immune response, and support tissue regeneration.

In an era increasingly constrained by antimicrobial resistance, this Ayurvedic approach represents a valuable step toward integrative surgical care. By aligning traditional wisdom with modern clinical needs, the *herbo-mineral* formulation the potential of *Ayurveda* to offer effective, evidence-informed compound in prevention of surgical site infection.

## CONCLUSION:

Successful outcome of *Ayurveda* formulation *Herbo-mineral* preparation (coded) in prevention of surgical site infection in open inguinal hernia repair is a new gateway for Ayurveda surgeons. Surgery can be performed in *Ayurveda* institutions without antibiotics in the pre- and post-operative period.

**Declaration of Patient Consent**:

Authors certify that they have taken patient consent form, where the patient has given his consent for reporting the case along with the images and other clinical information in the journal. The patient understood that his name and initials will not be published and due efforts will be made to conceal his identity, but anonymity cannot be guaranteed.

**Limitations of the study:**

This is single case report and need to trial tis herbomineral formulation in more post operative cases for its validation. In the institute trial is under process and also coded drug is under patent so it is not disclosed.

But after completion of the trial and getting IPR the author will write the letter to editor regarding the details of this coded formulation in coming time.

**Conflict of interest:** The author declares that there is no conflict of interest.

**Guarantor*:*** The corresponding author is the guarantor of this article and its contents.

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