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Case Report

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Simultaneous Bilateral Inguinal Open Hernioplasty Through Bilateral Mini Crease Incisions

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Abstract

Inguinal hernia repair is one of the most common surgical procedures performed in GS. This article describes a unique technique of bilateral groin hernia repair. Open Hernioplasty through a relatively mini incision is associated with less postoperative complications and local tissue trauma leading to rapid recovery. Males are mainly affected which leads to interruption in their performance of routine physical activities especially in the labour class of developing countries that has a major impact on their personal productivity which can be minimized by adopting this technique. Historical background inclusion has not only made the article interesting but it will help the young surgeons to understand the challenges faced by pioneer surgeons to ultimately find successful surgical techniques to decrease recurrence of inguinal hernia repair to less than 2%, which, of course, needs further improvement.

By mini crease incisions, bilateral open hernioplasty is cost effective and simple way of both side inguinal hernia repair simultaneously, especially where laparoscope is not available and even if it is available, open procedure is better as it has no intra-abdominal complications like bowel /bladder injuries or port site hernia.

Inguinal hernia repair is in fact the restoration of normal anatomy of inguinal canal so knowledge of the groin region anatomy is the corner stone in the performance of this procedure. Anatomical details of the inguinal canal are included in this article so that one can understand the surgical procedure steps and ability to perform surgery perfectly.

This technique is novel and adopted after performing many open bilateral inguinal hernia repairs simultaneously.

Use of index finger. In many steps of surgery like clinical assessment of inguinal hernia and DRE before surgery. During surgery, assessment of posterior inguinal wall weakness, stretch in the superficial/deep ring, elevation of the spermatic cord out of inguinal canal, palpation of vas, pushing the posterior inguinal wall behind while plication of the transversalis fascia, hernial sac contents reduction and saving the vas deference from injury while doing sac dissection near the deep ring. Use of the index finger makes the procedure very simple and safe.

Keywords:

DRE: Digital rectal examination.
GS: General Surgery.
MOH: Ministry of Health
KSA: Kingdom of Saudi Arabia
TEP: Total extra peritoneal repair.
TIPP: Trans inguinal pre peritoneal repair.
TAPP: Trans abdominal pre peritoneal repair

Introduction

Inguinal hernia repair is one of the commonest procedures performed by general surgeons. It is estimated that 70 % 0f abdominal wall defects are due to inguinal hernia, which has a risk of 27% in men and 3 % in women throughout life.

Manual workers and laborers are mainly affected. Prolonged standing, lifting of heavy load, chronic cough, constipation, BPH and family history of inguinal hernia increases the incidence of groin hernia. It affects not only the patient, but the whole family, as most of the time patients are the only bread winner for their family. So, treatment option should be economical, effective with minimal interruption in the patients work and less post procedural complications with rapid recovery.

Treatment of inguinal hernia is surgical. Open mesh repair is still the gold standard technique of inguinal hernia repair with less than 2% recurrence rate and a few complications like postoperative pain.

Chronic postoperative pain can minimize by gentle tissue dissection, minimal use of cautery, meticulous tissue handling and repair, avoiding taking local nerves in the sutures while anchoring the mesh over the posterior inguinal wall.

Having anatomical knowledge of the groin is very important key factor to achieve good results of the inguinal hernia surgery. Bilateral Inguinal hernia surgery can be conducted at the same time through mini, horizontal crease incision with mesh placement to avoid readmission. It is cost effective with rapid recovery and minimal interruption in the routine activities of patients.

Historical background

Evidence of surgical repair of inguinal hernia can be traced back to civilizations of ancient Egypt and Greece. Early management of inguinal hernia involved a conservative approach using trusses. The insufficiency of this approach prompted the initiation of a surgical approach to the problem. The treatment was often worse than the treatment itself. Surgery involved routine excision of the testicle and wound was closed with cauterization or left to granulate on their own. Before the advent of the aseptic techniques the mortality was high. For those who survive the disease recurrence was common. Failure of the early techniques was based on inadequate knowledge of groin anatomy.

From the late1700 to the early 1800 physicians such as Hasselbach, Cooper, Camper, Scarpa, Richter and Gimbernat identified vital components of the inguinal region. It coupled with the development of anatomic technique which lead Marcy and Kocher to enter the inguinal canal and perform sac dissection, high ligation and closure of internal ring.

Bassini (1844-1924) transformed inguinal hernia repair into a successful procedure with reconstruction of inguinal wall causing minimal morbidity and mortality. This technique was modified by Shouldice in to a tension free layered anatomical repair of posterior inguinal wall.

Lichtenstein (1920-2000) described tensionless repair by placement of Marlex mesh over the entire floor of inguinal canal to bridge the defect with mesh rather than placing tension between tissues to close the defect.

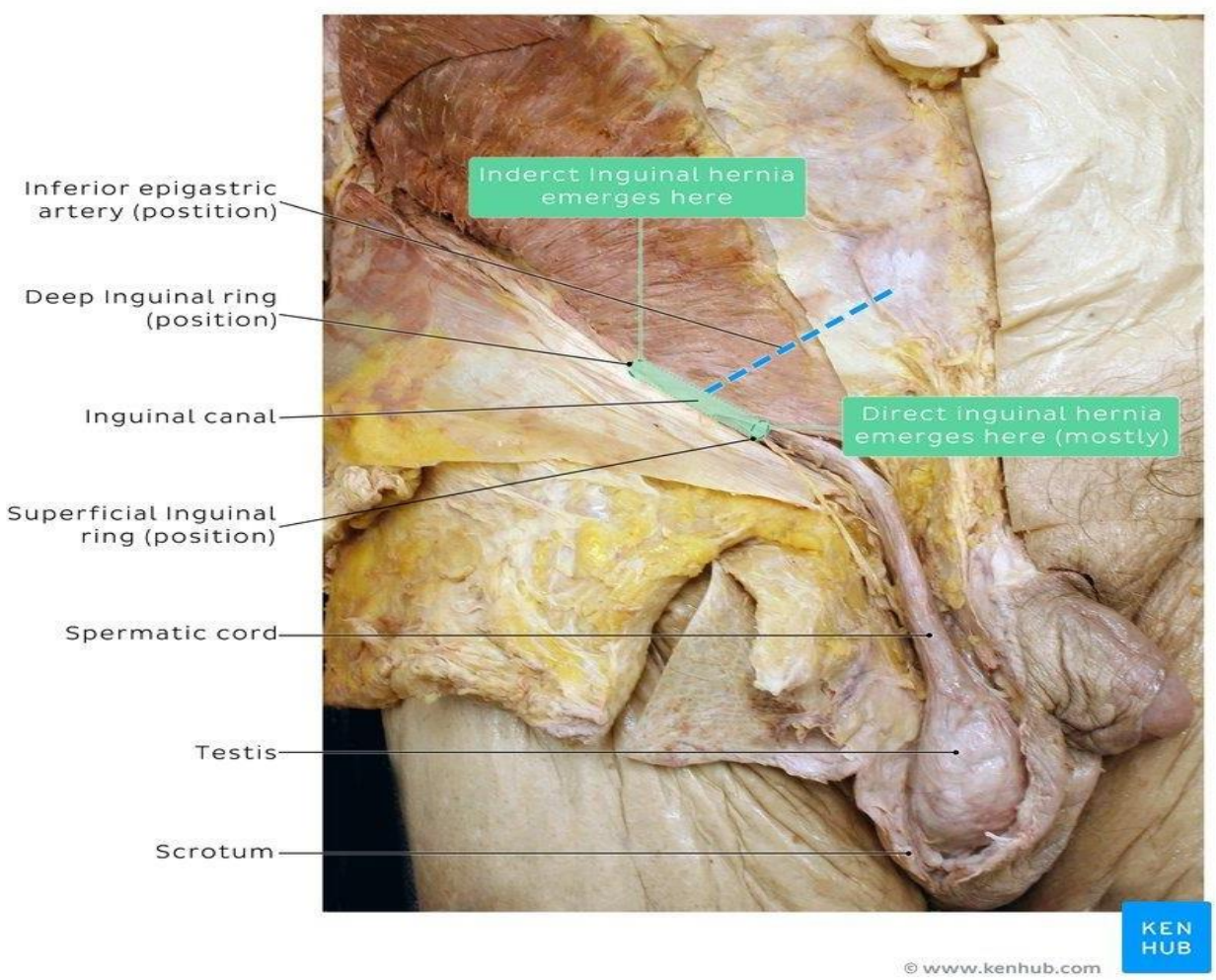
Superior results could be achieved by non-expert hernia surgeons with this technique.
Moloney (1912-1997) repaired the hernia with Nylon suture darn between conjoint muscle and inguinal ligament.
Ralph Ger (1921-2012) introduced the laparoscopic method of hernia repair. Intra-abdominal Onlay mesh was introduced by Fitz gibbons and Toy in 1990.

Trans abdominal pre-peritoneal and total extra peritoneal technique (Arregui 1991) and advancement in prosthatic material has decreased the incidence of recurrence and postoperative pain.

Robotic surgery is a new technique for repairing hernias introduced in 2007. It is a minimal invasive procedure that is an alternative to traditional open surgery. Advantages include three dimensional images, small scars, less postoperative pain, faster recovery as there is less tissue trauma and more precise way of surgery. Occult hernias are detected in in 16% of Robotic inguinal hernia repair.

Irrespective of the approach to hernia repair, treatment of inguinal hernia depends on a sound foundation of the inguinal anatomy and hernia repair is in fact restoration of the normal anatomy of the inguinal canal.

Anatomical consideration



A hernia is an abnormal protrusion of an organ or tissue through an opening in the layer that normally confines it. It consists of three parts: the sac, the content of the sac and the coverings of the sac. The hernial sac is a pouch (diverticulum) of peritoneum and has a neck and a body. The hernial contents of an abdominal hernia may consist of any structure found within the abdominal cavity and may vary from a small piece of omentum to a large viscus. The hernial coverings are formed from the layers of abdominal wall through which the hernial sac passes. Inguinal hernia may be direct, indirect or femoral.

Indirect hernia passes through the deep ring lateral to the inferior epigastric vessels. It is the remains of processes vaginalis and therefore is congenital in origin. It is named bubonocele if the sac is in the inguinal canal, funicular if the sac extends to the upper pole of testicle and complete if the sac reach to the base of scrotum. It is 20 times more common in males than in females. Nearly one third are bilateral. It is more common on the right. Normally the Rt. Processus vaginalis is obliterated after the left. It is most common in children and young adults. It is more common than direct inguinal hernia.

The sac is above and medial to the pubic tubercle while femoral hernia is located below and lateral to the pubic tubercle. Direct inguinal hernia composes about 15% of all inguinal hernia. The sac bulge directly through the posterior wall of the inguinal canal medial to the inferior epigastric vessels. Because of the strong conjoint tendon, the hernia is nothing more than a generalized bulge and neck is wide. It is rare in women. It is the disease of old men with weak abdominal muscles and is bilateral.

Inguinal canal is an oblique passage through the lower part of the anterior abdominal wall about 4 cm in length extending from deep to superficial ring. In males it allows structure of spermatic cord to pass to and from the testis and abdomen, ilioinguial and iliohypogastric nerves and in female smaller canal allows the round ligament of the uterus to pass from the uterus to the labium majus.

Superficial inguinal ring is a triangular shaped defect in the external oblique aponeurosis above and medial to pubic tubercle. Deep ring is an oval opening in the transversalis fascia lies 1.3 cm above the inguinal ligament midway. Anterior wall of the inguinal canal is formed by external oblique aponeurosis, strengthened laterally by the internal oblique.
Posterior wall formed by the conjoint tendon medially and the transversalis fascia laterally. Superior wall is formed laterally by the transversalis fascia, centrally by musculo-aponeurotic arches of the internal oblique and transversus abdominis muscles and medially by the medial crus of the external oblique aponeurosis. Inferior wall (Floor) formed by the upturned edge of the inguinal ligament and at its medial end lacunar ligament.

Femoral hernia
Femoral hernia is more common in females because of the wider pelvis and femoral canal. Femoral artery enters the thigh below the inguinal ligament, occupy the lateral compartment of the femoral sheath. The femoral vein which lies on its medial side and is separated from it by fibrous septum, occupying the intermediate compartment. The lymph vessels occupy the most medial compartment separated from the vein by the fibrous septum.

The femoral canal, the compartment of the lymphatics occupy the medial part of the sheath is half inch long. Its upper opening is considered as the femoral ring. It is related anteriorly to the inguinal ligament, posteriorly to the pectineal ligament and the pubis, medially to the sharp free edge of the lacunar ligament and laterally to the femoral vein. The hernial sac descends through the femoral canal within the femoral sheath, that is a protrusion of the fascial envelope lining the abdominal wall and surround the femoral vessels and lypmhatics for about 1 inch below the inguinal ligament.

The neck of the sac is difficult to expand and may lead strangulation of hernial contents. The femoral septum which is condensation of extra peritoneeal tissue, plugs the opening of the femoral ring. Hernial sac passes down the femoral canal. On escaping through the lower end, it expands to form a swelling in the upper part of the thigh deep to the deep fascia. With further expension the hernial sac may turn upwards to cross the anterior surface of inguinal ligament.

Classification of Inguinal Hernia
The classification system allows for standardization in comparing outcome of various hernias

Gilbert Classification System
Type 1 - Small indirect
Type 2 - Medium indirect
Type 3 - Large indirect
Type 4- Entire floor direct
Type 5 - Diverticular direct
Type 6 - Combined (Pantaloon)
Type 7 - Femoral

Nyhus classification system
Type I - Indirect hernia, internal ring normal, typically in infants, children and young adults.
Type II - Indirect hernia, internal ring enlarged without impingement on the floor of the inguinal canal, does not extend to the scrotum.
Type III A - Direct hernia, size is not taken into account
Type III B - Indirect hernia that has enlarged enough to encroach upon the posterior inguinal wall, indirect sliding or scrotal hernia also include pantaloon hernias
Type III C - Femoral hernias
Type IV - Recurrent hernias modifiers A-D sometimes added, which correspond to indirect, direct, femoral and mixed respectively

Surgical Technique

The patient underwent bilateral inguinal hernioplasty under epidural anesthesia. First, right inguinal hernia was operated on followed by left. Mini right sided groin crease incision measuring about 5 cm was made, the external oblique aponeurosis was incised 1-2 cm more cranially than the skin incision, which allowed easy entry into the intermuscular plain where good space creation in the intermuscular plain was possible. The incision in the external oblique aponeurosis extended from the superficial to the deep inguinal ring for adequate exposure. Two separate 5 cm horizontal crease incisions were used for bilateral inguinal hernia repair one by one. An important point in this technique is to avoid unnecessary soft tissue dissection before dividing external oblique aponeurosis. After opening the inguinal canal, spermatic cord, transversalis fascia, inguinal ligament and pubic tubercle were visualized. Deep ring stretch and posterior wall weakness were assessed.

I use my index finger in the assessment of posterior wall, deep ring stretch, size, type (Direct, indirect, femoral) contents of the hernia sac and weakness of conjoint muscles and conjoint

tendon. Index finger tip is also used for blunt dissection and creation of space between External oblique aponeurosis and internal oblique laterally and posterior inguinal wall consisting transversalis fascia and conjoint tendon down till inguinal ligament after elevation of the cord structures. We reduced the hernia first as It is very difficult to lift the spermatic cord out of inguinal canal before reduction of the contents of the indirect sac.

Moving tips of index fingers behind the spermatic cord over the pubic tubercle at the medial end of the wound to lift the cord structures out of inguinal canal is an impotent step in hernia surgery. After the cord was elevated the mesentery of the cord was divided taking care to avoid injury to inferior epigastric vessels medial to the deep ring.

It is very simple in case of direct inguinal hernia to separate the sac from the cord and push it behind by your index finger and putting continuous prolene 2/0 suture to approximate upper and lower border of transversalis fascia to invaginate it behind which makes spread of mesh over the posterior inguinal wall very easy. In our case in addition to Indirect hernia, there was posterior wall bulge of transversalis fascia which was invaginated behind by 2/0 proline running suture, which made mesh placement very easy after dealing with indirect sac.

Longitudinal incision was made over the anterior aspect of spermatic cord near the deep inguinal ring to divide cremaster muscle fiber longitudinally, avoiding injury to veins and separation of the sac from the cord. Proximal sac dissected free from the cord structures and divided distally with the cautery. After the cut margins cauterized and the distal sac divided longitudinally it was left as such. There is no need to dissect out distal sac as it may cause operative complications like injury to vas deferens, testicular vessels and testicular ischemia or scrotal hematoma may occur postoperatively.

Hernia sac transaction is associated with a lower incidence of seroma/ hematoma rate and shorter hospital stay. Mohamed et al 2023.

For proximal sac dissection while assistant hold the edges of the sac with artery forceps, I use my index finger to identify and protect vas deferens specially while applying suture to ligate the neck of the sac. Stretched deep ring was reconstructed by Prolene 0 suture medial to the deep ring between conjoint muscle and inguinal ligament before spreading the mesh over the posterior Inguinal wall. There was sufficient overlap of mesh on conjoint muscles/ tendon superiorly, crossing over pubic tubercle 3 to 4 cm medially and 5 cm lateral to the deep ring below the external oblique aponeurosis.

Before the external oblique aponeurosis closure, it was made sure that there was no ooze or any gauze in the canal. A few interrupted sutures were applied to approximate the internal oblique muscle fibers and cord was gently stretched down the scrotum without twisting it.

External oblique aponeurosis was closed over the cord making sure that superficial ring was not tight enough, which might lead to secondary varicocele. While suturing external oblique small bite of tissue were taken to avoid obliteration of the inguinal canal. Same procedure was repeated on the left on the left side.

With 5cm horizontal crease incision on either side repair had better cosmetic effect and there was no scrotal or penile swelling post operatively. Patient followed for 4 months after mesh repair of bilateral indirect inguinal hernia and there is no postop complication till now.

Discussion

Inguinal hernia is a common surgical problem. It is estimated that 70 % 0f abdominal wall defects are due to inguinal hernia which has a risk of 27% in men and 3 % in women throughout life. Manual workers and laborers are mainly affected having H/O prolonged standing, lifting of heavy load, chronic cough, constipation, BPH and family history of Inguinal hernia.

More than 20 million inguinal hernia repair procedures are performed worldwide annually. Treatment option should be economical and effective with minimal interruption in the patient work and less post procedural complications with rapid recovery.

Open mesh repair is still the gold standard technique of inguinal hernia repair with less than 2% recurrence rate and a few complications like chronic postoperative pain. Open mesh repair techniques results are even better than TEP repair as there is no need to dissect pre peritoneal space leading more tissue trauma and bleeding. The European Hernia society guidelines recommend Lichtenstein repair for unilateral hernia repair Yuichi et al 2019. We use this technique in bilateral inguinal hernia repair.

Laparoscopic repairs are by transabdominal pre peritoneal TAPP, trans inguinal pre peritoneal TIPP and total extra peritoneal TEP approaches. This treatment is costly and not available everywhere. TEP is preferred over TAPP Manog kumar et al 2023, Sung Gu Kim et al 2021. A gradual shift towards TEP has been observed worldwide because of reduced risk of bowel injury, bowel adhesions and incisional hernia formation, Manoj et al 2023.

In selective patients like recurrence after open repair TAPP or TEP is the better option to avoid difficult dissection in adhesions of previous surgery. TAPP is feasible and effective for female pts with groin hernia as there is low incidence of complications, especially femoral hernia. It is also effective technique in huge bilateral hernias. In Lichtenstein repair there is even less tissue trauma with under vision mesh fixation. That is why there is less incidence of mesh dislodgement/ recurrence or entrapment of ilioinguinal nerve in the sutures. It is cost effective as there is no need of laparoscope.

The incidence of groin hernia in female is lower about 8% 0f groin hernia but the rate of emergency surgery is 3-4 time higher. Femoral hernia has a higher rate of incarceration and strangulation than inguinal hernia. Ronggui et al 2023.

The recurrence rate in TAPP is 8.5%, which may be above 30% diagnosed by imaging studies post operatively Saddia et al 2023, while Open mesh repair has much lower recurrence rate about 1% and possibility of port site hernia cannot be ruled out in TAPP repair.

TEP and TAPP repair seems comparable in terms of postoperative Hernia recurrence and chronic pain. Alberto et al 2021. TAPP has the additional advantage of bilateral inguinal hernia repair at the same time, in recurrent hernia cases after

failed anterior repair. Prolene mesh in the pre peritoneal space also has the additional advantage of preventing the future development of femoral and obturator hernia.

The operative time, recurrence is related to the experience of surgeon. Ahmad et al 2023.
The results of open mesh repair (Lichtenstein) are comparable in the hands of expert surgeon.

External oblique aponeurosis incision is made more cranial to the groin crease skin incision when performing the Lichtenstein procedure so there is less chance of injury to spermatic cord and vessels, entry between the external aponeurosis and internal oblique muscle/conjoint tendon is easier and more space is created for mesh placement. It minimizes injury to nerves and spermatic cord. Roseberg et al 2016.

Postoperative urine retention is common and need bladder drainage for 24 hours especially after spinal and epidural anaesthesia. Local Pain, hematoma/seroma and after open repair of inguinal hernia is less if there is gentle tissue handling, meticulous dissection during surgery and avoiding excessive use of cautery and taking the nerve in anchoring stitch. Recent evidence suggests that patients often receive more opioids than needed to treat acute pain. Gentle C.K. et al 2022. By spinal and epidural anesthesia postoperative pain is less and NSAID are enough.

Some surgeons prefer intentional neurectomy during hernia repair without any complications except temporary hypo asthesia or numbness. Prophylactic ilioinguinal nerve neurectomy seems to offer some advantages concerning postoperative pain in the first 6 months postoperative period, it might be possible that the small no of cases contributed to the insignificancy regarding paresthesia and hypoesthesia Roberto et al. 2021.

We prescribe postoperative laxatives for few days to avoid constipation. Lichtenstein open mesh repair technique has decreased the incidence of recurrent inguinal hernia to less than 2 percent. Matikainen et al 2020. Bokkirink WJV 2019.

Poor orodental hygiene may increase the incidence of postoperative infection, so oral hygiene need improvement before elective procedures and there is a role of prophylactic antibiotic coverage during surgery as in orthopedics and cardiovascular surgery procedures B. East et al 2023. Antibiotic prophylaxis reduces the risk of surgical site infection in open hernia repair Lolwah Al Riyees et al 2021 Treating local skin, soft tissue, oro dental infections and control of DM before surgery decreases the incidence of postoperative infections.

Hip and leg mobility and stability tests are useful to evaluate the recovery time after inguinal hernia repair. Egle et al 2018.
Risk factors for contra lateral hernia are old age and BPH. Cheng Hung Lee et al 2017.

Ahmad et al" the mean age of the patients in this study group was 54,6. Age of my patient was 49 years.
Incidence of inguinal hernia increases with age as predisposing factors for hernia are more in the elderly, like chronic cough, constipation, BPH ". Weak ventral wall, prolonged standing and exertion are also contributing factors for the development of hernia.

Conclusion

Simultaneous bilateral Lichtenstein repair is safe and cost effective technique, with recurrence rate less than 2 %. There is minimal tissue trauma of surgery and no intraabdominal complications or incisional hernia as in TAPP laparoscopic approach. With bilateral open mesh repair there is no need of readmission and patient returns to his routine work early. So we recommend simultaneous bilateral lichtenstein inguinal hernia repair with minimal complications and recurrence.

Chronic post op pain can be minimized by gentle tissue handling, avoiding taking nerve in the suture while anchoring mesh over the posterior inguinal wall. The operating surgeon should have sound knowledge of anatomy and must be performing this procedure frequently.

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I acknowledge that this surgical work is my own effort and Dr Fatima Babar and Dr Shahab Ahmad has contributed in this work

Conflict of interest

There is no conflict of interest in this study.

Authors contribution

1. Zaheer Ud Din Babar Malik Sajjad
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Consultant GS. MOH, KSA.
Hernia surgery procedure was performed by me. Surgical technique and abstract of the Article were written by me

2. Fatima Babar
Trainee Registrar, pediatric surgery.
MBBS, MRCS
Description of inguinal region anatomical details and proof reading.

3. Ahmad-al-Shahab
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Collection of references and proof reading.

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