

## Review Article

# Desarda versus Lichtenstein Technique for Primary Inguinal Hernia Repair: A Review

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### Abstract:

*Inguinal hernias is an important medical problem. Worldwide, inguinal hernia repair is one of the most common surgeries, performed on more than 20 million people annually. The observed complication rates and postoperative dysfunction have influenced many investigators to look for new hernia repair techniques or to modify old ones. Currently, the Lichtenstein technique is considered to be the criterion standard. Numerous comparative randomized trials have clearly demonstrated the superiority of the tension-free mesh repair over the traditional tissue approximation method. Desarda's method satisfies the principles of "no tension" presented by Lichtenstein. Application of the external oblique muscle aponeurosis in the form of an undetached strip (which makes the posterior wall of the inguinal canal stronger) has been established as a new concept in tissue-based hernia repair. The best operative technique should have the following attributes: low risk of complications (pain and recurrence), relatively easy to learn, fast recovery, reproducible results and cost effectiveness. One indisputable advantage of Desarda's technique is its low cost. Economic issues are not the only considerations. The use of synthetic material (Mesh) is still controversial in young patients. Hernia occurrence and recurrence depends not only on techniques of operation or experience of surgeons; the ideal operation to treat inguinal hernia is still far to define. However, better outcomes are definitely possible. Treatment of groin hernia patients will improve if we honor all stakeholders' interests (patients, hospitals, surgeons and society).*

**Keywords:** Inguinal Hernia, Desarda's repair, Lichtenstein technique, Mesh

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### Introduction:

Because of their frequency, inguinal hernias (IH) remain an important medical problem. The observed complication rates and postoperative dysfunction have influenced many investigators to look for new hernia repair techniques or to modify old ones. An example of such efforts is the Desarda's method, which was presented in 2001 and became a new surgical option for tissue-based groin hernia repair<sup>1,2</sup>.

Choosing the best or most suitable groin hernia repair technique is a true challenge. The best operative technique should have the following attributes: low risk of complications (pain and recurrence), (relatively) easy to learn, fast recovery, reproducible results and cost effectiveness. The decision is also dependent upon many factors like: hernia characteristics, anesthesia type, the surgeon's preference, training, capabilities and logistics. The patient's wishes must be considered. There are cultural differences between surgeons, countries and regions. Emotions may play a role as well.

Before going to compare the best method for primary inguinal hernia repair, we need to know the fact that what hernia is and the predisposing factor

for hernia formation and structure of the inguinal canal.

### Risk factors for the development of inguinal hernias in adults:

- Inheritance (first degree relatives diagnosed with IH elevates IH incidence, especially in females)<sup>3</sup>.
- Gender (IH repair is approximately 8-10 times more common in males).
- Age (peak prevalence at 5 years, primarily indirect and 70-80 years, primarily direct)<sup>4,5</sup>.
- Collagen metabolism (a diminished collagen type I/III ratio).
- Prostatectomy history (especially open radical)<sup>6</sup>.
- Obesity (inversely correlated with IH incidence)<sup>3,5,7</sup>.
- Primary hernia type (both indirect and direct subtypes are bilaterally associated)<sup>8</sup>.
- Increased systemic levels of matrix metalloproteinase-2<sup>9</sup>.
- Rare connective tissue disorders (e.g. Ehlers-Danlos syndrome)<sup>10</sup>.
- Race (IHs are significantly less common in black adults).
- Chronic constipation<sup>3,11</sup>.

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- Tobacco use (inversely correlated with IH incidence).
- Socio-occupational factors.
- There is contradictory evidence that social class, occupational factors and work load affect the risk of IH repair<sup>12</sup>.
- Heavy lifting may predispose to IH formation<sup>13</sup>.
- Pulmonary disease (COPD and chronic cough possibly increasing the risk of IH formation)<sup>13</sup>.
- Liver disease, renal disease and alcohol consumption have not been properly investigated to determine if they are the risk factors for IH formation.

Currently, groin hernia treatment is not standardized. There were no written surgical guidelines for hernia treatment until 2009, when the European Hernia Society (EHS) published its recommendations based on analysis of the literature and the results of clinical trials. In the EHS guidelines, mesh-based techniques (the Lichtenstein technique in particular) and endoscopic methods are recommended for treatment of symptomatic primary inguinal hernia in adult men<sup>14</sup>. The EHS guidelines were updated in 2014<sup>15</sup>. The International Endo Hernia Society (IEHS) published guidelines in 2011 covering laparo-endoscopic groin hernia repair<sup>16</sup>.

Worldwide, inguinal hernia repair is one of the most common surgeries, performed on more than 20 million people annually<sup>17</sup>. Surgical treatment is successful in the majority of cases, but recurrences necessitate reoperations in 10-15% and long-term disability due to chronic pain (pain lasting longer than 3 months) occurs in 10-12% of patients. Approximately 1-3% of patients have severe chronic pain. This has a tremendous negative effect globally on health and healthcare costs.

Despite the objections presented by some authors<sup>18</sup>, application of the external oblique muscle aponeurosis in the form of an undetached strip (which makes the posterior wall of the inguinal canal stronger) has been established as a new concept in tissue-based hernia repair. The technique is original, new and different from the historical methods using the external oblique aponeurosis, proposed initially by McArthur<sup>19</sup> and Andrews or Zimmeann<sup>20</sup>, later on 2001 by Mohan Prasad Desarda.

However, better outcomes are definitely possible. Treatment of groin hernia patients will improve if we honor all stakeholders' interests (patients, hospitals, surgeons and society).

#### **Lichtenstein Mesh Repair:**

Currently, the Lichtenstein technique is considered to be the criterion standard<sup>21</sup>, with recurrence rates

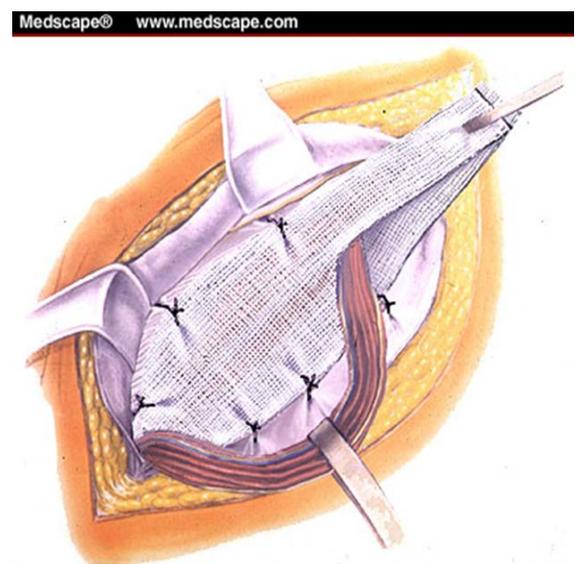
of less than 1% in the hands of an experienced surgeon.

These surgical techniques have been shown to be associated with reduced postoperative pain, a shorter recovery period and a lower complication index<sup>22</sup>. Existing techniques have very low and acceptable recurrence rates, but chronic pain and discomfort remain a problem for many patients. New mesh materials are being developed to increase biocompatibility<sup>23</sup>.

In 1958, Usher et al. was the first to perform inguinal herniorrhaphy using prosthetic mesh, thereby eliminating the tension associated with tissue approximation. However, mesh repair did not gain widespread acceptance until Lichtenstein et al. coined the term tension-free repair and advocated this approach in 1986<sup>23</sup>.

The Lichtenstein repair uses two types of mesh, either the lightweight or the heavyweight. Numerous comparative randomized trials have clearly demonstrated the superiority of the tension-free mesh repair over the traditional tissue approximation method. Mesh implantation in front of the transversalis fascia is superior, safer and easier than open or laparoscopic mesh implantation behind the transversalis fascia<sup>24</sup>. It has a short learning curve. Even in the hands of non-specialized surgeons, recurrence rates for this technique are reported to be less than 2 percent<sup>25</sup>.

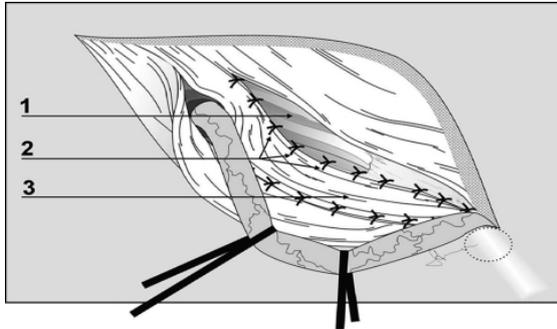
The use of an implant, however, exposes the recipient to a lifelong risk of infection. Implants are prone to bacterial colonization, and opportunistic infections may occur for up to 39 months after implantation<sup>26</sup>.



**Figure-1: Lichtenstein Mesh Repair**

### Desarda's Repair:

In Desarda's repair the newly formed posterior wall is kept physiologically dynamic by the additional muscle strength provided by external oblique muscle to the weakened muscles of the muscle arch. This new method of inguinal hernia repair is based on physiological principles<sup>27</sup>.



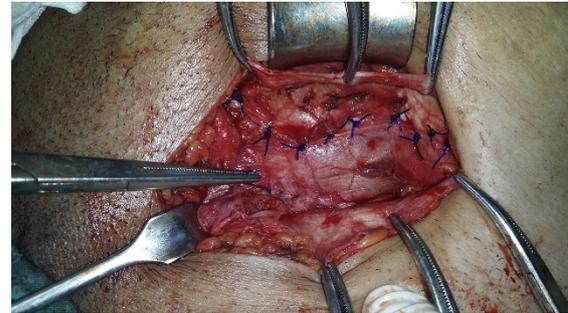
**Figure-2: Desarda's method.** The undetached aponeurotic strip (3) is created and displaced from the anterior to the posterior wall of the inguinal canal. It was then secured to the abdominal internal oblique muscle (1) with interrupted sutures (2) and to the inguinal ligament.



**Figure-3: Desarda's repair:** A splitting incision made in the medial leaf of EOA partially separating a strip with a width equal to the gap between the muscle arch and the inguinal ligament<sup>40</sup>.

The technique involves pure tissue repair of any type of inguinal hernia, based on the concept of constructing a strong and physiologically dynamic posterior wall to the inguinal canal with the help of the external oblique muscle and its aponeurosis<sup>27</sup>. The operation is simple to perform, with a short

learning curve, which does not require foreign body like a mesh or complicated dissection of the inguinal floor as in McVay or Shouldice. It has shown excellent results with virtually zero recurrence rates<sup>28</sup>. Many operations developed to date deal only with the anatomical aspects of the repair. Any failure in these operations is because the physiological aspects have not been considered while developing a new operating technique.



**Figure-4: Desarda's repair:** The upper free border of the resultant strip of EOA (with its lower border already sutured to the inguinal ligament) sutured to the overlying internal oblique aponeurosis (or conjoined muscle) using nonabsorbable 2/0 suture in an interrupted manner<sup>40</sup>.

Even though the Desarda's repair has been reported to be associated with pleasantly low postoperative morbidities such as pain, wound sepsis and zero recurrence rate, the findings were majorly based on low evidence-level retrospective and single group prospective studies done by Prof. Desarda himself.



**Figure-5: Desarda's repair:** The inguinal canal closed by suturing the newly formed medial leaf of EOA to its lateral leaf with nonabsorbable 2/0 suture<sup>40</sup>.

### Discussion:

Hernia is derived from the Latin word 'herniae' for rupture. A hernia is the bulging of part of the contents of the abdominal cavity through a weakness in the abdominal wall<sup>29</sup>.

The surgical treatment of inguinal hernias has evolved through several stages to reach a modern and successful era. It has been said that the history of groin hernias is the history of surgery itself<sup>30</sup>.

Despite the frequency of this procedure, no surgeon has ideal results and complications such as postoperative pain, nerve injury, infection, and recurrence continue to challenge surgeons<sup>31</sup>.

Desarda's method satisfies the principles of "no tension" presented by Lichtenstein. The aponeurotic strip is displaced from the anterior to the posterior wall of the inguinal canal without additional tension at the posterior wall. The concept of an undetached, movable aponeurotic strip that "physiologically" enforces the posterior wall of the inguinal canal is original and interesting<sup>24,25</sup>. When considering the Desarda's technique as "dynamic enforcement" of the inguinal canal's posterior wall, the Lichtenstein method can be called "prosthetic enforcement." The author of the first method hypothesizes that a naturally displaced and movable aponeurotic strip is far more "physiological" than the scar tissue produced around a synthetic prosthesis for creating a mechanism against reherniation.

As a result of the introduction of tension-free surgical techniques, more importance has been given to their outcome in terms of patient's postoperative pain, length of hospital stay and quality of life<sup>22</sup>. Since recurrence rates have been reduced with mesh repairs, outcome research in groin hernia repair has recently focused on chronic pain. Chronic pain adversely affects daily life for 5-10 per cent of the patients<sup>32</sup>. The intensity of acute pain after herniorrhaphy is related to the risk of developing chronic postoperative pain<sup>32</sup>.

Pain is the most common discomfort experienced by patients after an ambulatory inguinal herniorrhaphy. It is influenced by age<sup>16</sup>, weight, sex, preoperative pain level, operative technique, hernia anatomy, the extent of nerve entrapment or damage of the ilioinguinal, iliohypogastric, and genitofemoral nerves<sup>33</sup>, and other postoperative complications<sup>34</sup>.

Mitura and Romanczuk have published the results of a 6-month follow-up study of the Desarda and Lichtenstein approaches<sup>35</sup>. They observed no recurrence, and pain after 6 months was comparable in the two groups (VAS scores were 8 vs. 11 in the Desarda and Lichtenstein groups, respectively;  $p = 0.691$ ). Situma et al. presented their short-term results of Desarda versus modified Bassini inguinal hernia repair, concluding that there was no difference between these two techniques in regard to pain and return to normal activity<sup>36</sup>. Other results, published by Desarda and his group, were based on a comparison of his technique and the Lichtenstein technique<sup>37</sup>. They reported no recurrence among the 269 Desarda group patients and 1.97% recurrence among the 225 mesh group patients; 6.49% of patients from the mesh group and no patients in the Desarda group reported chronic pain at one year after surgery.

Szopinski in his comparative study on hernia repair method which was carried on 208 male patients for 3 years, showed that there is no significant difference in outcomes after hernia repair with Desarda and mesh based Lichtenstein techniques. Chronic pain after hernia repair was a little higher in Desarda group but there was significantly less seroma production in this group and foreign body sensation and return to activity were not different between the groups<sup>38</sup>.

BS Gedam in his comparative study compared the two techniques on the basis of primary outcome factor which is early (<1 year) recurrence of inguinal hernia and secondary outcome factors included operative time. Post-operative complication evaluation was based on operative time, cord edema, seroma, groin discomfort surgical site infection chronic Pain, etc. There was no difference in rates of post-operative complication among the two arms of the study. But post-operative pain was significantly less in Desarda group and time taken to return to basic and home activities was significantly less in Desarda group<sup>39</sup>.

Youssef T during his 2-year follow up, found one recurrence in each group. Chronic groin pain was experienced by 5.6% and 4.2% of the patients from Desarda and Lichtenstein groups respectively. There was significantly shorter operating time and earlier return to normal gait in favor of Desarda repair. Foreign body sensation was not different between the two groups<sup>40</sup>.

Paradoxically, in the modern world the cost of the medical treatment becomes the real issue. The cost of inguinal hernia treatment, a tiny fraction of all health expenses, is not insignificant. However, especially in developing countries like Asia or Africa, one indisputable advantage of Desarda technique is its low cost. That is why many published articles recently demonstrated an interest in the technique<sup>41</sup>. The cost of the Desarda operation is low because a synthetic prosthesis is not needed. The price of composite meshes or even heavy polypropylene meshes, as well as their accessibility, could be important issues in developing countries.

Economic issues are not the only considerations. The use of synthetic material is still controversial in young patients. The effect of polypropylene placement or other synthetic mesh inside human organism for a lifetime is still unknown. Also, data are appearing about sexual impairment after mesh implantation; and as a result, many surgeons try to avoid mesh prostheses for hernia treatment in young patients. Also, the Desarda method, a tissue-based technique, can be used in a contaminated surgical field, usually seen during operations for the strangulated hernia.

### Conclusion:

Successful inguinal hernia treatment without mesh implantation can be achieved by using Desarda repair, as it is effective as the standard Lichtenstein procedure. Shorter operating time, early return to normal gait, less postoperative pain, complications similar to standardized technique and lower cost (no mesh) are potential benefits of Desarda repair. Desarda technique has the potential to enlarge the number of tissue based methods available to treat groin hernias. The dream of every surgeon to give recurrence-free inguinal hernia repair without leaving any foreign body inside the patient may well become a reality in future. But as hernia occurrence and recurrence depends not only on techniques of operation or experience of surgeons, the ideal operation to treat inguinal hernia is still far to define.

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