Overview of the updated management of inguinal hernia

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ABSTRACT
Inguinal hernias are the most common type of hernias with a worldwide prevalence of 5%, yet limited data on the updated management is available. In this study, an overview of the different classic and updated management ways of the case of inguinal hernia around the world was carried out. This systematic review study was based on PubMed database searches for published articles about the management of inguinal hernias. After applying the inclusion and exclusion criteria, the 32 identified articles were further reduced to 22 articles for full-text assessment, and only 11 articles were included. Many researches on inguinal hernia were of poor quality. However, it was concluded that it is important for general practitioners to diagnose correctly and distinguish between inguinal and femoral hernias to best avoid complications. Eligibility for surgery is not procedure-specific and patient’s quality of life must be considered. The data supported the surgical mesh repair as the best technique in surgical repair of inguinal hernia.

Keywords: Inguinal hernia, management, classic, updated, databases, overview.

Introduction
Inguinal hernias are the commonest variety of hernias with a worldwide prevalence of 5% [1]. Causes and influencing factors of this disorders are not clearly known but there are some factors considered to be risk factors, such as the factors that increases the pressure in the abdominal wall, family history of hernia, collagen disorders, preceding right lower abdominal surgical incisions, smoking, excess physical effort, and lifting the heavy weights are considered [2,3].

There are two types of inguinal hernia, direct and indirect, comprising 24% and 50% of all types of hernia, respectively [4]. Besides, ventral and femoral hernias comprise about 10% and 3%, respectively, in addition to the rare types of hernias [5]. Also, hernias might be reducible or irreducible [6]. One of the commonest procedures in general surgery is restoration of inguinal hernias, rates reaching from 10/100,000 in the UK to 28/100,000 in USA [7].

There is an incredible unmet need for inguinal hernia repair worldwide. In USA, about 800,000 inguinal hernia conservations were achieved in 2003, with rate of 275/100,000 population [8]. In comparison, only 30 inguinal hernia operations/100,000 population were performed annually in sub-Saharan Africa [9]. In 2001-2002, about 70,000 inguinal hernia repairs (62,969 primaries, 4,939 recurrent) were completed in England, requiring about 100,000 hospital bed days [10]. There are more than one type of treatments in case of inguinal hernias, but the ultimate management of all hernias, irrespective of cause or category, is surgical treatment [11]. In this review, an overview of the different updated management ways of inguinal hernia around the world is observed.

Materials and Methods
This is a systematic review article. The data were collected during the period from 1 to 31 April, 2020. PubMed database searches were carried out for the published articles about the management of inguinal hernias. This database was selected as it is a high-quality source. Only articles published in the English language were included.
due to lack of official translation resources. The duplicates and non-obtainable studies were excluded. Articles based on title and abstract were also excluded. All the studies that did not focus on inguinal hernia management and were of study types that were not expected to be useful for this review were also excluded. The remaining studies using different methodologies were included. After applying the inclusion and exclusion criteria, the 32 identified papers were further reduced to 22 papers for full-text assessment and only 11 papers were included.

No software was utilized to analyze the data. The data were extracted based on a specific form containing title of the publication, publication year, study design and setting, author’s name, objective, and results. These data were reviewed by the group members to determine its initial findings. A double revision of each member was applied to ensure the validity and to minimize the mistakes.

Discussion

In this study, the results of some studies which discussed the best ways and management techniques in inguinal hernias repair, with the minimum problems and maximum satisfactory results were examined (Table 1).

In The Hernia Surge Group [12] study, the guidelines for the management of adult inguinal hernia were established, which lead to better outcomes. It was recommended to provide both anterior and posterior approaches. Lichtenstein and laparo-endoscopic reparation were best appraised. Numerous other procedures need further assessment. However, in Jenkins and O’dwyer [13] study, it was found that surgical treatment was the best choice, including nylon darn, ice layered, Lichtenstein mesh, and laparoscopic reparation. The best repair was evaluated using randomized clinical trials and population-based studies. Open mesh repair was used by non-specialist physicians, and hereafter open repair was the favored repair procedure for prime inguinal hernia (in 96% of UK surgeons, 99% of Japanese surgeons, 95% of Danish surgeons, and 86% of US surgeons [23].

In Beard et al.’s [14] study, the incidence of inguinal hernia in Tanzanian patients was reported as 5.36% in females and 12.09% in Tanzanian men. Tanzania’s current estimated hernia restoration rate is 30 per 100,000 population; a total of 995,874 hernias required repair over the projected time frame. It was also indicated that the prevalence of hernia was projected by the method under three surgical rate scenarios: Tanzania’s current surgical repair rate, the US repair rate, and an elimination repair rate calculated by the method. An inguinal hernia repair rate of 357 per 100,000 population per year would be required to eliminate hernia over the next 10 years.

Furthermore, in Mahmoudvand et al. [15] study, a randomized clinical trial was conducted on 150 cases for inguinal herniorrhaphy with mesh. Patients were randomly assigned to two treatment groups. From 150 patients, 75 were assigned to the classic method and 75 were assigned to the preperitoneal method. The study reported that the preperitoneal technique was a more appropriate for inguinal herniorrhaphy as it leads to fewer complications.

Additionally, in Köckerling and Simons [17] study, it was found that patients with prime inguinal hernia repair still developed recurrence in 11% and chronic pain in 10%-12%. A much heated controversy was generated over what is the best operation for repair of inguinal hernia. The answer was probably the technique that the surgeon knows well and does best. The new International Guidelines of the Hernia-Surge Group, with representatives from all continental hernia societies, only recommended the open mesh, Lichtenstein technique and the laparo-endoscopic mesh techniques Totally Extra Peritoneal (TEP) and Transabdominal Preperitoneal (TAPP).

Furthermore, in Davies and Campbell [18] study, 32 questionnaires were filled by trainees (21 senior house officers and 11 registrars) from hospitals in the south of England, according to the hernia repairs recorded in their logbooks. There was a considerable disparity in the quantity of training and supervision given for inguinal hernia repair.

<table>
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<tr>
<th>Table 1. Summary of studies included in the current study (n = 11).</th>
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<tbody>
<tr>
<td><strong>Publication (Author, Year)</strong></td>
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<tr>
<td>Jenkins et al., 2008 [13]</td>
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<td>Beard et al., 2013 [14]</td>
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<td>Mahmoudvand et al., 2017 [15].</td>
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<td>Vincent and Singh, 2017 [16].</td>
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<td>Köckerling and Simons, 2018 [17].</td>
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<td>Davies and Campbell, 1995 [18]</td>
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<td>Wang, 2012 [19]</td>
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<td>Grosfeld, 1989 [20]</td>
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<td>Fasih et al., 2000 [21]</td>
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<td>LeBlanc and Kingsnorth, 2003 [22]</td>
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</table>
Updated management of inguinal hernia

Whereas, in Fasih et al. [22] study, 200 successive patients with inguinal hernias experienced mesh plug repair. The majority of patients had primary hernia and the minority had recurrent hernia. All types of hernia were involved. Groin pain, which was the main symptom, was relieved in 96% of the patients; 79% performed their original jobs within 4 weeks. Retired cases restarted their usual life with in 2 days. Postoperative pain was mild; 28 cases did not need any postoperative analgesics. There were very few slight and no great complications. But one recurrence had arisen later.

Inguinal hernias represented 75% of abdominal wall hernias; its lifetime risk of occurrence is 27% in men and 3% in women [24]. The repair of inguinal hernia is one of the commonest operations in general surgery [7]. Selecting the most appropriate inguinal hernia repair procedure is the most important part of the operation. The best operational procedure should fulfill the following qualities: little risk of complications (pain and recurrence), (comparatively) easy to learn, rapid recovery, precise consequences and cost-effectiveness. The decision is likewise reliant on numerous influences as hernia characteristics, anesthesia type, the surgeon’s preference, training, capabilities and cost. Nowadays, the majority of surgeons choose to carry out a tension-free mesh repair [16].

The introduction of the synthetic mesh made it possible to join large breaches in the tissues without tension; so, it is possible to treat every hernia, irrespective of its size or shape and the mesh was applied with very good achievements regarding the repair of recurrent inguinal hernias [25]. This ‘tension-free’ method was improved by Lichtenstein and Gilbert and Graham [26] to be a ‘tension less and suture less’ technique.

Several features of postoperative problems of herniorrhaphy were debated in numerous studies. In a study carried out by Khoshevis et al. [27], on the results and complications of Bassini’s approaches and Lichtenstein and Bassini’s approaches with mesh in Tehran (Iran), it was reported that Bassini and Lichtenstein’s approaches had comparable complications and recurrence. However, the Bassini method could be more suitable for inguinal hernia repair in developing countries because it is less expensive. Another study was carried out by the Hernia Surge Group [12] on a group of worldwide surgeons and anesthesiologist with precise involvement in hernia-linked research and discussed their experience in inguinal hernia repair. It was reported that inguinal hernias’ diagnosis could be established by physical examination only in most of the cases with proper signs and symptoms, and rarely ultrasound was necessary.

Asymptomatic or slightly symptomatic male inguinal hernia cases could be managed with ‘watchful waiting’, as in these cases the risk of hernia-associated emergencies is small. Most of these cases would consequently need surgery; so, the risks of surgical management and the watchful waiting approach should be argued with the cases. It was also recommended that mesh repair be the first choice, either by an open procedure or a laparoscopic repair technique. These results agreed with Davies and Campbell study [18], which recommended surgical repair in the management of all hernias, irrespective of the origin or type.

Furthermore, according to Wang [19], inguinal hernia restoration in infants is a repetitive surgical technique which is precise, accurate, and sensitive. Numerous issues, including the suitable time of the repair, the necessity to explore the opposite groin, usage of laparoscope, and anesthetic approach, remain unsettled; however, surgical repair remained the technique of choice in such cases. This is supported by the findings of Grosfeld [20]. Moreover, in Mahmoudvand et al. [15] study, the exposed classic and preperitoneal procedures were argued. Mesh was used in the two methods. The mean scores of quality of life, comprising bodily and psychological health, were nearly comparable in all procedures with mesh, but they possessed an important difference in contrast with the tissue repair technique [28]. Therefore, it was claimed in the current study that the method of repair with mesh is a better method than the tissue method.

In Moghaddam et al.’s study, a painful site of operation was lesser in the preperitoneal technique than in the classical technique. Although the classic technique is more simple, the pain is higher, and the reason could be the direct contact of the spermatic cord with the mesh. On the other hand, the operation site pain was less in the preperitoneal technique as the mesh was introduced with fewer sutures underneath the transversalis fascia [29].

The limitation of the study included that the articles were restricted to those in the English language, while publication bias might have weighted studies with positive findings.

**Conclusion**

Many researches on inguinal hernia were of poor quality. However, it was concluded that it is important for general practitioners to diagnose correctly and distinguish between inguinal and femoral hernias to best avoid complications. Eligibility for surgery is not procedurespecific and patient’s quality of life must be considered. The data support the surgical mesh repair as the best technique in the surgical repair of inguinal hernia.

**List of Abbreviations**

<table>
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<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tr>
<td>TAPP</td>
<td>Transabdominal Preperitoneal</td>
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<tr>
<td>TEP</td>
<td>Totally Extra Peritoneal</td>
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<tr>
<td>TEP</td>
<td>Totally Extra Peritoneal</td>
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<tr>
<td>UK</td>
<td>United Kingdom</td>
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<td>USA</td>
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The authors declare that there is no conflict of interest regarding the publication of this article.

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