Management of Asymptomatic Inguinal Hernia

A Systematic Review of the Evidence

Hagar Mizrahi, MD; Michael C. Parker, FRCS

Objective: To establish a literature-based surgical approach to asymptomatic inguinal hernia (IH).

Data Sources: PubMed, the Cochrane Library database, Embase, national guidelines (including the National Library of Guidelines Specialist Library), National Institute for Health and Clinical Excellence guidelines, and the National Research Register were searched for prospective randomized trials comparing surgical treatment of patients with asymptomatic IH with conservative treatment.

Study Selection: The literature search retrieved 216 article headlines, and these articles were analyzed. Of those studies, a total of 41 articles were found to be relevant and 2 large well-conducted randomized controlled studies that published their results in several articles were reviewed.

Data Extraction: The pain and discomfort, general health status, complications, and life-threatening events of patients with asymptomatic IH managed by surgery or watchful waiting were determined.

Data Synthesis: No significant difference in pain scores and general health status were found when comparing the patients who were followed up with the patients who had surgery. A significant crossover ratio ranging between 23% and 72% from watchful waiting to surgery was found. In patients with watchful waiting, the rates of IH strangulation were 0.27% after 2 years of follow-up and 0.55% after 4 years of follow-up. In patients who underwent elective surgery, the range of operative complications was 0% to 22.3% and the recurrence rate was 2.1%.

Conclusion: Both treatment options for asymptomatic IH are safe, but most patients will develop symptoms (mainly pain) over time and will require operation.


Inguinal hernia (IH) occurs when a peritoneal sac protrudes through a weak point within the groin area. It often contains abdominal content and is traditionally treated with surgery. As a rule, IH is diagnosed by a simple physical examination except in cases where the diagnosis is obscure; in these cases, different modalities are used for confirmation. Asymptomatic IH is a term used to describe the condition in a patient who has a groin bulge or impulse cough with only minor or no symptoms. On the other hand, an incidental operative finding of an internal ring defect with no groin lump or other symptoms is defined as an occult IH, a condition prevalent since the introduction of laparoscopic surgery.

Inguinal hernia repair (IHR) is the most frequent elective operation performed in the United States and Europe, although when comparing the rate of surgery performed to treat IH there is great variety among different populations. For example, IHR is done in 10 per 10,000 people in the United Kingdom, while the rate is 28 per 10,000 people in the United States. There are several possible explanations for this observable fact, including different primary care management, costs, and insurance policies.

As in any other operation, elective IHR carries its share of complications. Surgical site infection, hematoma, urinary retention, and other short-term morbidities are well known, as are long-term complications including chronic groin pain, neuralgia, and IH recurrence. However, postponing the operation might carry a risk of acute IH and visceral organ strangulation with additional risks of gangrene, perforation, and infection of the peritoneal cavity. Hence, operations in the emergency setting for incarcerated IH have higher morbidity and mortality rates.

The aim of this review is to establish a surgical approach to asymptomatic IH by...
The literature search retrieved 216 article headlines, and the search included the following terms: "inguinal hernia," "groin," "hernia," "incidental," "occult," and "natural history," with the use of Boolean operators and/or with an age limit of older than 19 years (adults only). All trials and report headlines irrespective of language or publication status were read by 2 independent readers (H.M. and M.C.P.) and sorted by their relevance. The reference lists of obtained articles were also searched to identify additional relevant citations, and further abstract reading of those publications was performed.

### INCLUSION AND EXCLUSION OF ARTICLES

Prospective randomized trials comparing surgical treatment and conservative treatment of patients with asymptomatic IH were eligible for this review. The methods, inclusion and exclusion criteria, follow-up period, early and late complications, IH recurrence, and mortality rate were examined in each article. Articles that offered data concerning patients with symptomatic IH, presented retrospective data or case series data, or dealt with the cost-effectiveness of the treatment of IH were excluded.

### IDENTIFICATION OF TRIALS

An electronic search was performed from 1966 to April 2011 using PubMed, the Cochrane Library database, Embase, national guidelines (including the National Library of Guidelines Specialist Library), National Institute for Health and Clinical Excellence guidelines, and the National Research Register. The search included the following terms: hernia, inguinal, groin, asymptomatic, incidental, occult, and natural history, with the use of Boolean operators and/or with an age limit of older than 19 years (adults only). All trials and report headlines irrespective of language or publication status were read by 2 independent readers (H.M. and M.C.P.) and sorted by their relevance. The reference lists of obtained articles were also searched to identify additional relevant citations, and further abstract reading of those publications was performed.

### METHODS

#### ELIGIBLE TRIALS

The literature search retrieved 216 article headlines, and these articles were analyzed. Of those studies, a total of 41 articles were found to be relevant. After eliminating editorial letters and nonrelevant or methodically unsound papers (such as articles dealing with economic evaluation), only 2 large well-conducted randomized controlled studies that published their results in several articles were reviewed. Two review articles written by the same groups of authors who performed the randomized controlled studies were also found. The Figure summarizes the process of identifying eligible clinical trials. The Table describes the articles included in this review along with a short description.

#### RISK OF BIAS

The randomized controlled studies included in this review followed male patients only. An important difference between the studies is the difference with ages. The O’Dwyer group included patients aged 55 years and older with an average of 3.2 years from diagnosis. The Fitzgibbons group included younger patients (aged ≥18 years), of whom 15% were diagnosed as having had an IH for less than 6 weeks (Table).

Inguinal hernia is a common condition, with a rate varying between 0.6% and 25.2% among males within different age groups and populations. Abramson et al used the Bailey examination technique to diagnose IH while surveying the male population of West Jerusalem between 1969 and 1971. They subdivided patients who had obvious IH and those with a more subtle defect. They found that the obvious IH rate among men aged 25 to 34 years was 1% and that the rate of cough impulse felt when performing physical examination (digitation of the inguinal canal) was 11%. In that study, the rate of obvious IH rose with age, while the rate of cough impulse on palpation only decreased; when surveying the population older than 75 years, the study found obvious IH in 29.8% and cough impulse on palpation in 4.3%. This study not only implies a relationship between prevalence of symptomatic IH and age but also suggests that IH progresses with time.

The natural history of IH progression is vague in the literature, mostly owing to the traditional approach of operating on almost any patient with the diagnosis. Only 2 prospective randomized controlled trials analyzed the options of watchful waiting vs operation. Fitzgibbons et al had conducted a multicenter study sponsored by the American College of Surgeons, and O’Dwyer et al published a single-team, single-hospital study. Both trials compared groups of patients having open IHR with those having follow-up only.

The outlines for the studies by Fitzgibbons et al and O’Dwyer et al are important as they are the main source of evidence-based information for this discussion. Fitzgibbons et al conducted a multicenter study suggesting that observation is an acceptable alternative to open-approach tension-free repair for patients with minimal or no IH symptoms. The patients were followed up for a minimum of 2 years with an expected primary...
outcome measure of pain or discomfort using a 4-item graded scale and general health status (36-Item Short Form Health Survey) and a secondary outcome measure of costs of treatment. Postoperative complications, life-threatening events, and deaths were also recorded.8,9 A follow-up study of the group of patients who had surgery was published recently to identify the characteristics of the patients with failure by a management of observation.9 O’Dwyer et al conducted a randomized prospective clinical trial that examined the 1-year outcome of operation vs a watchful waiting policy in male patients aged 55 years or older who had asymptomatic IH for more than 3 years. They measured pain at rest and movement with a visual analog scale at baseline, 6 months, and 12 months as well as general health status using a questionnaire (36-Item Short Form Health Survey)10 and published the long-term outcomes after an average follow-up time of 7.5 years (range, 6.2-8.2 years).11

Although there are several differences between the studies by Fitzgibbons et al and O’Dwyer et al, both showed no difference regarding pain and discomfort between the patients who had surgery and those who were followed up. Some of the participants in the study by O’Dwyer et al who were randomized to the operation group had waited for more than 6 months before surgery. Results from analyses on an intention-to-treat basis as well as treatment received were very similar. The long-term follow-up report for the same group of patients showed that after 5 and 7.5 years, the rates of conversion to surgery were 54% and 72%, respectively, mainly because of pain. No significant difference in pain scores was found when comparing the patients who had an operation and those who were observed.12 Thus, the operation did not add significant chronic pain. The study by Fitzgibbons et al showed that pain interfering with daily activities was the same in both the operation and follow-up groups. Patients who crossed over from watchful waiting to surgery had reported an increase in pain after the operation, but by their 2-year follow-up the pain interfering with activities was not significantly higher than that in the group managed conservatively. The question of pain and discomfort caused by IH was the basis of the study by Hair et al that evaluated 699 patients before IHR. No pain was found in 24% of the cases and 71% did not report any effect of the IH during leisure activity. Using Kaplan-Meier regression analysis, Hair et al found that the cumulative probability of a patient presenting with pain increased with time to 90% at 10 years.

General health status was measured in both randomized controlled studies using a questionnaire. In the study by O’Dwyer et al, improvement was noticed in the operation group compared with the watchful waiting group during follow-up (calculations were identical when performed on an intention-to-treat basis as well as for actual treatment received). On the other hand, the study by Fitzgibbons et al showed similar results of general

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### Table. Articles Included in This Review

<table>
<thead>
<tr>
<th>Study Group</th>
<th>Source</th>
<th>Description</th>
<th>Participants</th>
<th>Intervention or Grouping (Patients, No.)</th>
<th>Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fitzgibbons group</td>
<td>Fitzgibbons et al11, 2003</td>
<td>Study protocol description RCT of watchful waiting vs open IH repair</td>
<td>Men aged ≥18 y with asymptomatic or minimally symptomatic IH</td>
<td>Observation (364) vs open IH repair (336)</td>
<td>Pain and discomfort interfering with usual activities 2 y after enrollment and postoperative complications</td>
</tr>
<tr>
<td></td>
<td>Fitzgibbons et al9 2006</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thompson et al10, 2008</td>
<td></td>
<td>Description of outcomes of early surgery vs delayed surgery in patients with asymptomatic IH</td>
<td>Patients from the Fitzgibbons et al study who had immediate tension-free IH repair vs delayed IH repair</td>
<td>Surgery within 6 mo of diagnosis (288) and after 6 mo from diagnosis (65)</td>
<td>Complications, pain, functional status, and patients’ satisfaction after mean follow-up of 13.4 mo (range, 9-33 mo) from surgery</td>
</tr>
<tr>
<td>Sarosi et al14, 2011</td>
<td></td>
<td>Identifying preoperative characteristics of patients who had failed observation of asymptomatic IH</td>
<td>Patients from the Fitzgibbons et al study who crossed over from observation to surgery or had developed considerable pain</td>
<td>Watchful waiting (250) vs crossover from watchful waiting to surgery (72)</td>
<td>Preoperative factors that will predict patient crossover to surgery</td>
</tr>
<tr>
<td>O’Dwyer group</td>
<td>O’Dwyer et al10, 2006</td>
<td>RCT of observation vs operation for patients with asymptomatic IH</td>
<td>Men aged ≥55 y with asymptomatic IH</td>
<td>Observation (80) vs open IH repair (80)</td>
<td>Pain score 1 y after enrollment</td>
</tr>
<tr>
<td>Chung et al12, 2011</td>
<td></td>
<td>Long-term outcome of patients with painless IH</td>
<td>Patients from the O’Dwyer et al study</td>
<td>Examine long-term outcomes of patients with asymptomatic IH for median follow-up of 7.5 y (160)</td>
<td>Rate of crossover from observation to surgery and contralateral or recurrent IH development</td>
</tr>
</tbody>
</table>

Abbreviations: IH, inguinal hernia; NA, not applicable; RCT, randomized controlled trial.
health status in both the operation group and the watchful waiting group. This variation might be related to the basic study characteristic differences, namely age, nature of the IH (obvious bulge as opposed to cough impulse only), and time of follow-up. The Fitzgibbons group had also published a follow-up study using a family survey among patients’ relatives concerning daily activities. Family members of patients assigned to have watchful waiting expressed more concerns about the individual’s ability to perform daily activities compared with patients who had surgery. The scientific basis of this study is subject to some degree of criticism as the questionnaire was developed specifically for this trial and, although it was pilot tested in a sample of family members, it was never retested in other studies of patients with asymptomatic IH.

When advising a patient for an observation alternative as opposed to an operation, the degree of crossover and acute IH ratios deserve special consideration. Both mentioned studies showed a significant crossover ratio ranging between 23% and 72% depending on the period of follow-up. In both groups, the reasons for crossing over were increase in size and pain of the IH. When trying to identify the characteristics of a patient who might fail an observation, the Fitzgibbons group found that the contributing factors for crossover other than pain were marital status, low American Society of Anesthesiologists score, chronic constipation, and prostatis.

No influence of surgery delay by 6 months was found when evaluating the long-term outcomes of IHR in 399 patients who had undergone operation (300 who were originally randomized for surgery and 99 who crossed over from the watchful waiting group). The rates of IH strangulation in one study were 1 in 364 patients (0.27%) after 2 years of follow-up and 2 in 364 patients (0.55%) after 4 years. The study by O’Dwyer et al. showed an acute IH rate of 1 in 80 patients (1.25%) after a year and 2 in 80 patients (2.5%) after 7.5 years. No patients needed bowel resection. Other calculations of the acute IH event ratio estimated a strangulation rate of 2.8% after 3 months and 4.5% after 1 year, but those were based on retrospective data for symptomatic patients waiting for surgery and deserve a different approach.

Elective surgery might cause short- and long-term complications, which are worth mentioning when dealing with asymptomatic patients. Studies of open IHR estimate that the average rate of surgical site infection is 1% to 5%, although there are reports of higher rates. The rates of postoperative hematoma and urinary retention are approximately 7% and 2%, respectively. Fitzgibbons et al. have published a total postoperative complication rate of 22.3%, while O’Dwyer et al. had no serious postoperative complications and a recurrence rate of only 2.1%. One review had published a recurrence rate of 7% after different operation types for IHR. The rate, of course, varies with different surgical techniques, surgeon experience, and anesthetic choices. Cunningham et al. studied chronic pain in 276 patients who had inguinal herniorrhaphy. At 1 year of follow-up, 62.9% reported some degree of pain and nearly 12% had moderate to severe pain. After a 2-year follow-up, the rates were 53.6% for any pain and 10.6% for moderate to severe pain, but this study compared 3 groups of patients who had an operation and no control group of observation only was used.

Early data relating to complications and recurrence rate of laparoscopic IHR were not good, probably owing to the learning curve of the techniques. Surgeons have now gained more experience and the rate of recurrence in recent studies varies between 0% and 5%. Chronic pain after laparoscopic IHR is thought to be less, although the data regarding this issue are not conclusive. In the MRC Laparoscopic Groin Hernia Trial, 28.7% of the patients in the laparoscopic group had pain a year after the operation compared with 36.7% of the patients in the open IHR group. A 5-year follow-up study for the same groups of patients revealed no difference in chronic pain, although there was a higher degree of testicular pain in the laparoscopic repair group. Another study demonstrated chronic pain and a neuralgia rate of 9.8% in the laparoscopic group compared with 14.3% in the open group at 2 years. However, no difference in chronic pain was found between open and laparoscopic repair in the SCUR Hernia Repair Study. Laparoscopy enables diagnosis of internal ring defects and peritoneal sac protrusion defined as an occult IH. The diagnosis of occult IH while performing laparoscopic contralateral side IHR varies between 7.97% and 38%. Paajanen et al. prospectively examined 201 consecutive cases of laparoscopy for reasons other than IH and found the rate of occult IH to be 21%. Thumbe and Evans had conducted a clinical follow-up for patients diagnosed as having a contralateral defect during laparoscopic IHR and found that 28.6% of the patients had a contralateral defect that became symptomatic after 12 months. Again, the natural history of an occult IH has yet to be established, but occult IH is likely to be a step within the development of symptomatic IH. The finding of occult IH during laparoscopic surgery raises the question of repair. Although this is beyond the aim of this article, one cannot ignore the resemblance between the question of management of occult and asymptomatic IH. Also, to our knowledge, there are currently no studies comparing laparoscopic IHR results with observation only for asymptomatic IH.

The treatment of asymptomatic IH forces the clinician to choose between 2 treatments options, each of which is safe. However, most patients will develop symptoms (mainly pain) over time and will require operation. We believe that, as in any medical condition, the surgeon should weight treatment options against possible complications and tailor management to the specific patient.

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Correspondence: Hagar Mizrahi, MD, Department of General Surgery A, Haemek Medical Center, Sderot Yishak Rabin, Afula 18101, Israel (hagarmizrahi@gmail.com).

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REFERENCES


