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Initiation of the Dutch Inguinal Hernia Audit (DIHA): A survey on support for registration, obstacles, and possible areas of improvement

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Abstract

BACKGROUND: Quality assessment and improvement of surgical procedures can be achieved by clinical audits that provide feedback on benchmarking of surgical outcomes. The Dutch Institute for Clinical Auditing (DICA) has successfully initiated registries with a clear impact on healthcare quality. Currently, there is no Dutch national inguinal hernia (IH) audit. This survey aimed to investigate the opinions of Dutch surgeons regarding the registration of IH care and explore potential obstacles in the implementation of a Dutch Inguinal Hernia Audit (DIHA).

MATERIALS AND METHODS: A web-based survey was sent to all (>2,000) members of the Dutch Surgical Society, including surgeons and residents.

RESULTS: Two-hundred sixty-seven respondents replied between April 14 and June 26, 2022 (hospital distribution: 36% small peripheral, 44% large peripheral, 11% academic, 2% specialized clinic). Almost two-thirds (60%) agreed that the quality of IH care should be improved. Similarly, nearly two-thirds (59%) answered that this improvement could be achieved through registration of surgical outcomes. Those opposed to registration stated fear of increased administrative burden and that the quality of care is already adequate. The majority of respondents agreed that chronic postoperative inguinal pain (CPIP; 81%) and recurrence rate (81%) should be used as quality indicators of IH surgery and registered as patient-reported outcome measures (PROMs).

CONCLUSION: The majority of respondents agree that the quality of IH care could potentially be improved by implementing a national IH registry, with registration of CPIP and recurrence rate as quality indicators. Collecting these PROMs in a digital, automated format will facilitate successful implementation by minimizing administrative burden.

Keywords:

Inguinal hernia surgery, patient-reported outcome measures, quality of surgical care, registration

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Introduction

Inguinal hernia (IH) repair is the most frequently performed elective surgical procedure worldwide, with an estimated 20 million repairs annually.[1] With the introduction of mesh repair, the recurrence rate has decreased to 1.8%.[2] Following this development, laparoendoscopic techniques have been adopted. These techniques have demonstrated no difference in recurrence rate compared with open repair.[3] Laparoendoscopic approaches did result in faster recovery after surgery and reduced postoperative complications (pain, hematoma, and wound infection) compared with an open anterior approach.[4] Consequently, the focus has shifted to quality of life, particularly chronic postoperative inguinal pain (CPIP). CPIP is defined by the

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International Association for the Study of Pain as pain persisting for more than 3 months postoperatively.[5] Yet, many different definitions and validated instruments to quantify CPIP have been identified,[6] which causes a need for the improvement in the reporting of surgical outcomes, as this reflects the quality of surgical care.

Surgical outcomes are influenced by several surgeon-, clinical-, and patient-related factors. Furthermore, surgical outcomes might be reported as intraoperative complications, early or late postoperative complications, quality of life, return to daily activities, and recurrence rate.[7] Currently, there is no uniformity in the reporting of outcomes after IH surgery, resulting in invalid comparisons and possible under-reporting of important outcomes.[8] Ideally, the outcomes and time of measurement should be standardized using surgeon-related and patient-reported outcome measures (PROMs).

Subsequently, the following question arises: How can we report these outcomes in order to better reflect routine daily practice? Population-based studies have the ability to assess quality of daily practice based on registration of short- and long-term outcomes of an unselected, large population. Such studies based on national registry data provide a high level of external validity and facilitate surgical care improvement.[7] Several successful national hernia registries exist, for example, the Swedish and Danish hernia registries.[9,10] Presently, there is no Dutch national IH registry. However, several clinical audits for different diseases and treatments have been successfully implemented in the Netherlands for quality assessment and improvement of care. These are obligatory and opt-in registry-like programs that provide feedback with benchmarking of surgical outcomes. These audits were initiated by the Dutch Institute for Clinical Auditing (DICA) and they have demonstrated a clear and positive impact on quality of care.[11-13] The aim of this survey was to assess opinions and thoughts of Dutch surgeons and residents regarding IH registration and to explore potential obstacles and advantages in the implementation of a Dutch Inguinal Hernia Audit (DIHA).

Materials and Methods

Design

A web-based survey was developed using Google Forms. The survey questions were designed by an expert group consisting of several dedicated and experienced hernia surgeons and researchers, including our two independent authors (FPJdH, JPJB). The questions were formulated in the Dutch language. The translation of the survey content is presented in [Table 1].

Table 1: Survey questions

Questions		Answers	
1.	In which hospital(s) are you currently employed?	1.	Open answer
2.	Do you perform inguinal hernia surgery?	2.	Yes / no If the answer is 'no', go to question 12.
3.	Which EMR system(s) is / are utilized in your hospital?	3.	HiX / Epic systems / other: open answer
4.	a. Does registration of outcomes of inguinal hernia surgery take place in your hospital at present? b. If so, how is this performed?	4.	a. Yes / no b. Open answer
5.	a. Do you think the quality of inguinal hernia surgery in the Netherlands should be improved? b. Why (not)?	5.	a. Yes / no b. Open answer
6.	a. Do you think registration of outcomes will contribute to the quality of inguinal hernia surgery? b. Why (not)?	6.	a. Yes / no b. Open answer
7.	a. Do you think this registration could have negative consequences? b. Why (not)?	7.	a. Yes / no b. Open answer
8.	Which system should be used to register outcomes of inguinal hernia surgery?	8.	EMR / external system / an application / other: open answer
9.	Which of the following DICA process and outcome indicators do you consider to contribute to the quality of inguinal hernia surgery?	9.	Multiple answers possible: DICA process and outcome indicators* / none of the above / other: open answer
10.	Which of the following indicators do you consider to contribute to the quality of inguinal hernia surgery?	10.	Percentage of patients with CPIP > 3 months / recurrence rate / number of days to return to work / number of days to return to sports / none of the above
11.	Which indicators not mentioned earlier do you consider essential in order to assess quality of inguinal hernia surgery?	11.	Open answer
12.	Do you have any comments?	12.	Open answer

EMR, electronic medical record; HiX, Healthcare Information eXchange; DICA, Dutch Institute for Clinical Auditing; CPIP, chronic postoperative inguinal pain
*DICA process and outcome indicators as described in the Materials and Methods section

The survey was created in accordance with the checklist for reporting results of internet e-surveys (CHERRIES).[14] Approval from the local Institutional Review Board was not mandatory for this type of study. Before starting the survey, all respondents were thoroughly informed about the identity of the investigators and the study goals. No personal or identifying information from the participants was collected or stored.

Twelve questions were posed, varying between multiple-choice and open questions. All questions were listed on a single page. The order in which the questions were listed was fixed. The following topics were addressed: participant characteristics, assessment of the current situation, possible views regarding the implementation of an IH registry, DICA process and outcome indicators, and other indicators to determine the quality of IH surgery. Finally, additional remarks could be added. Answering was voluntary and questions could be left open, if desired.

DICA process and outcome indicators

DICA facilitates 26 national registries for multiple conditions across various disciplines. Most of these registries still require manual input from healthcare personnel. For IH registration, they now propose a set of process and outcome indicators, that can automatically be extracted and abstracted from the already existing hospital administrative data, reducing administrative burden associated with the registry. These indicators consisted of the following: preoperative additional imaging, time in days between the first visit to the outpatient clinic and IH repair, operative time, surgical technique, anesthesia technique, length of postoperative stay, postoperative additional imaging, blood sampling of infection parameters and culture within 30 days postoperatively, reoperation within 30 days postoperatively, emergency department visits and outpatient clinic consults within 30 days postoperatively, outpatient clinic consults at the pain department, number of procedures per hospital, and number of procedures per surgeon.

Participants

The survey was sent by e-mail to all (>2,000) members of the Dutch Surgical Society, including surgeons and residents. Access was permitted only through this specific link. Surgeons currently working outside the Netherlands and retired members were also invited to answer but were later excluded during the final analysis. The survey was available for respondents from April 2022 to June 2022. Data were stored in a protected electronic database and were only accessible to the researchers who contributed to this manuscript.

Analysis

Answers to the open-ended questions were categorized by two authors (RRM and FPJdH). Descriptive statistics were applied to all questionnaires, regardless of whether they were fully completed by all participants. These descriptive data were extracted using R Statistical Software (v4.3.0; R Core Team 2023). As hypothesis tests were not employed, missing data were categorized separately as "missing."

Clinical trial registry

Not applicable.

Results

Characteristics of respondents

Two-hundred sixty-seven respondents replied to the survey from April 14, 2022, up to and including June 26, 2022. Four respondents were excluded because they worked abroad (n = 3) or were retired (n = 1). One form was removed owing to its identical content to another

Table 2: Baseline characteristics of the respondents

	n	%
Type of hospital(s) currently employed (question 1)		
Academic	29	10.8
Large peripheral	118	43.9
Small peripheral	96	35.7
Specialized clinic	5	1.9
Other*	2	0.6
Missing	19	7.1
Performs inguinal hernia surgery (question 2)		
Yes	237	90.5
No	24	9.2
Missing	1	0.3
Type of EMR system(s) (question 3)		
Epic systems	39	14.8
HiX	157	59.5
Nexus	10	3.7
SAP	22	8.3
Other	11	4.2
Missing	25	9.5
Any form of inguinal hernia registration at present (question 4a)		
Yes	78	29.8
No	158	60.3
Missing	26	9.9
Type of registration (question 4b)		
Complication registration	18	23.1
EMR	20	25.6
Own system	9	11.5
Quantities†	10	12.8
Combination of the aforementioned answers	4	5.1
Not specified	6	7.7
Other‡	11	14.2

EMR, electronic medical record; HiX, Healthcare Information eXchange; SAP, Systems, Applications, and Products in Data Processing
*Currently unemployed (n = 1) and employed at a military hospital (n = 1)
†Examples are: Total amount of procedures, different techniques, procedures per surgeon, length of stay, etc.
‡Specified in the Results section, paragraph 'Registration at present'

form; thus, it was regarded as a duplicate. Baseline characteristics of the respondents are summarized in [Table 2].

Registration at present

At present, nearly one-third (30%) of the respondents answered that some form of registry is implemented locally in their institution. Of these, 26% register in their own electronic medical record (EMR). Eighteen respondents use complication registration to assess the quality of IH surgery. Other methods were reported by 14% of the survey participants, such as digital forms and PROMs.

Quality improvement

Almost two-thirds (60%) agreed that the quality of IH care should be improved [Figure 1]. Proponents argued that registration 1: leads to quality improvement (16%), 2: provides overview and transparency (13%), and 3: increases standardization of care (7%). Opponents predominantly assumed that the current quality of IH care is of a high standard (17%). Other opposing reasons were 1: the belief that only experienced, dedicated teams should perform IH surgery to guarantee quality of care (6%); 2: the fear of increased administrative burden (3%); and 3: the conviction that other medical conditions require more urgent attention (e.g., complex abdominal wall surgery; 2%).

Of all the respondents, 59% answered that improvement could be achieved through registration of surgical outcomes. Proponents assumed that registration will 1: create overview and transparency of IH care (21%) and 2: create more understanding and awareness (8%). Opponents replied that 1: registration could increase administrative burden (9%), 2: the quality of care is already high and will not be further improved by such a registry (8%), and 3: there is a lack of clear definitions of quality indicators to register (5%).

Negative effects

Although opinions regarding registration were predominantly positive, approximately 60% recognized potentially negative consequences. The primary resistance was due to fear of an increased administrative burden (43%). Second, respondents argued that the outcomes of the registration could be interpreted incorrectly (15%), for example, by health insurance companies. Another fear was related to a potential consequence of higher complication rates based on benchmarking, after which some hospitals might have to stop providing IH care. Performance below the benchmark was also believed to potentially influence residents because this may cause IH surgery to become a procedure only reserved for experienced hernia surgeons, meaning that it will no longer be a training procedure. Five percent of the respondents reported no negative effects on IH registration when asked for specific reasons.

DICA process and outcome indicators / missed indicators

The majority of the respondents (71%) believed that registration should take place through the EMR [Figure 2]. Of the proposed DICA process and outcome indicators summarized in [Table 3], reoperation within 30 days postoperatively was considered the most important by 70%. Second, outpatient clinic consults at the pain department should be collected (57%). The majority of respondents agreed that CPIP (81%) and recurrence rate (81%) should be used as the main quality indicators of IH surgery [Figure 3]. It was agreed that both these parameters should be collected as PROMs. The largest group of indicators that was missing according to the respondents comprised of short-term complications such as seroma, hematoma, and wound infection [Table 3].

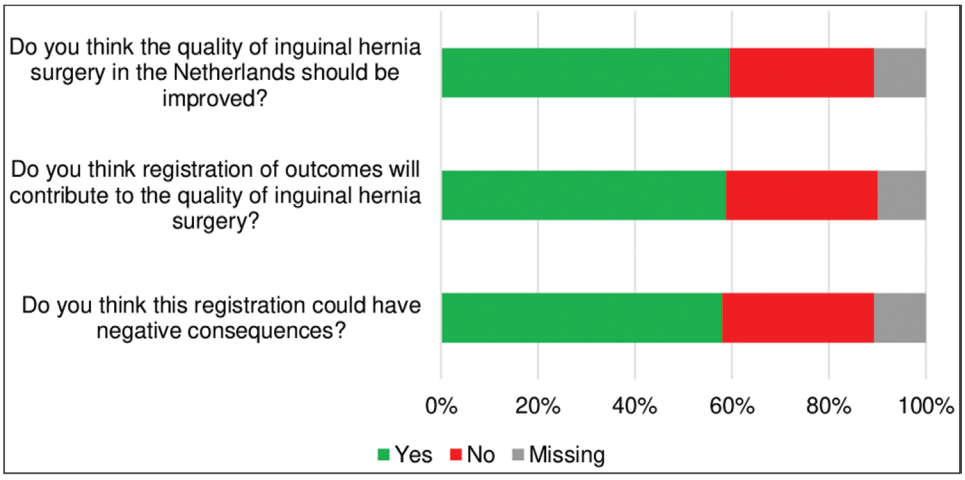

Figure 1: Current opinions about inguinal hernia registration

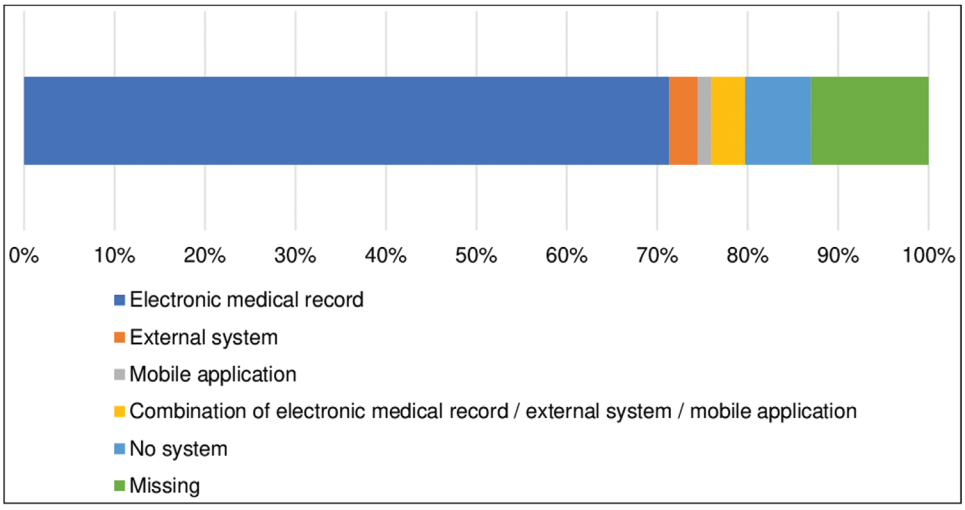

Figure 2: Which system should be used to register outcomes of inguinal hernia surgery?

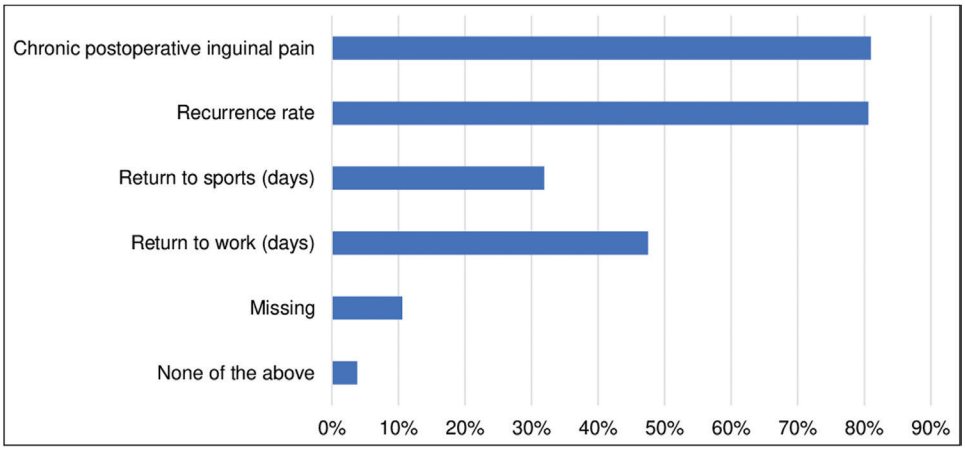

Figure 3: Which of the following indicators do you consider to contribute to the quality of inguinal hernia surgery?

Discussion

Most of the respondents acknowledged the potential benefits of a national IH registry in the Netherlands. Moreover, there was consensus on the registration of CPIP and recurrence rate as PROMs, which are currently thought to be the best representation of the quality of IH care. However, there were some major concerns regarding the potential negative consequences of the registry, like an increase in administrative burden and misinterpretation of the registry results.

The wish to implement a national IH registry started when the Dutch government announced its aspirations to increase transparency in healthcare. Looking at other international registries that displayed quality of care improvements through registration,[9,15] high-volume, low-complexity procedures (including IH surgery, cholecystectomy, and appendectomy) would be the starting point. Before initiating an IH registry, it was crucial to define the process and outcome indicators because the quality of the registered data (input) determines the quality of the output. This survey was initiated to inquire about the opinions of end-users of this registry. Before implementing a Dutch national IH registry, it is crucial to address the possible disadvantages and present counterarguments to build support and facilitate the registry's implementation.

In particular, logistic issues in developing a national IH registry present significant challenges. First, the Dutch privacy laws prohibit connectivity of EMR systems between different hospitals, even if they use the exact same system, which impedes the interhospital sharing of data. Currently, only pharmacists and general practitioners are allowed to request limited medical data with informed consent from patients, creating administrative burden. Extraction of valuable long-term outcome information, for example, when patients receive treatment for recurrence in another clinic, is hindered by these legal constraints.

Table 3: Overview of DICA process, outcome, and missed indicators

	n	%
DICA process and outcome indicators		
Anesthesia technique	70	26.7
Blood sampling of infection parameters and culture < 30 days postoperative	42	16.0
Emergency department visits and outpatient clinic consults < 30 days postoperative	115	43.9
Length of postoperative stay	74	28.2
Number of procedures per hospital	100	38.2
Number of procedures per surgeon	100	38.2
Operative time	42	16.0
Outpatient clinic consults at the pain department	149	56.9
Postoperative additional imaging	48	18.3
Preoperative additional imaging	68	26.0
Reoperation < 30 days postoperative	182	69.5
Surgical technique	140	53.4
Time in days between first outpatient visit and inguinal hernia repair	80	30.5
None of the above	15	5.7
Other	59	22.5
Missing	26	9.9
Missed indicators		
Complications	18	6.9
Costs	3	1.1
Experience	3	1.1
Patient satisfaction	12	4.6
PROMs	4	1.5
Recurrence and CPIP	11	4.2
Reoperation	5	1.9
Type of mesh	8	3.1
Other	16	6.1

DICA, Dutch Institute for Clinical Auditing; PROMs, patient-reported outcome measures; CPIP, chronic postoperative inguinal pain

Almost half (43%) of the surgeons in this survey feared the administrative burden of a registry. Many believe that this registry will be time-consuming, will be cost-inefficient, and will, therefore, have a negative impact on the quality of care. This indicates that proposing a national registry with increased administrative burden can lead to low participation rates. However, a national IH registry will only be successful if sufficient procedural and outcome data are available and if those data are of adequate quality, unless the registry is made obligatory. The Danish Hernia Database is the only registry in which data entry is compulsory for all hernia surgeons and covers more than 98% of all IH repairs.[16] All other existing registries are voluntary; therefore, completeness and validity of data depends upon the participating surgeons and hospitals.[16] There will always be a risk of selection and input bias, since registries do not have a verified system for checking the validity of the entered data.[16] In order to achieve the greatest compliance, there is a need for an automated registry system without involving healthcare personnel. In Denmark, surgeons record data in a simple form immediately after IH repair in adult patients.[17] A central secretariat enters this into the database by optical scanning.[17] The German and French registers, "Herniamed" and "Club Hernie,"[18,19] rely on input by surgeons themselves, increasing the already high workload. The authors believe that a reliable, high-quality national registry will only be feasible if there is no additional administrative burden.

There are different approaches to collect national data for high-volume surgical treatments: The Danish registry is based on patients' individual social security number,[17] which allows the determination of reoperation rates, independent of treatment site. This enables the most accurate estimation of the recurrence rate requiring reintervention and simplifies the collection of other important surgical outcomes. Another example is the study by Maneck *et al*.,[15] who analyzed routine data of the German Local General Sickness Fund (AOK) to investigate volume-outcome implications in relation to complications. Diagnostic codes (International Statistical Classification of Diseases and Related Health Problems) were used to establish a national database and to protect patient privacy, AOK data were anonymized.[15]

The Danish Hernia Database and Swedish Hernia Registry are publicly funded, while the other hernia registries rely on financial support from the medical industry.[16] The initiation of the Dutch IH registry would be partly funded by healthcare insurance companies. However, it is still unclear who will maintain the registry, both financially and functionally. Bearing these funds in mind, 15% of the respondents in our survey expressed concerns regarding the misinterpretation of the registry results. There was skepticism about who should be authorized to access the outcomes of the registry, whether this is limited to healthcare providers or also the government and healthcare insurers. Furthermore, there were concerns that hospitals performing below the benchmark may face limitations in conducting IH surgery or that specialized clinics may monopolize care, resulting among other consequences in diminished income. In earlier studies,[20,21] a significant relationship was demonstrated between caseload and outcomes. Nordin *et al*. found that Swedish surgeons performing one to five IH repairs annually were just a small part of the total workload, so their impact on the nationwide reoperation rate was minimal.[22] If these results are convertible to a Dutch IH registry, surgeons and hospitals are unlikely to receive penalties after benchmarking. However, it cannot be ruled out that the findings of a registry could be used for recommendations regarding the minimum annual volume of IH repairs to remain accredited.

One additional topic in this survey that was raised for discussion was the question of whether IH surgery should

be designated as a training procedure or only performed by experienced hernia surgeons, because it is believed to affect the quality of surgical care. Surgical skills and experience have been associated with better outcomes in terms of recurrence after endoscopic IH repair. Particularly for the totally extraperitoneal procedure, an extended learning curve has been observed.[23] If the implementation of the registry is successful, a potential scenario is that a complex procedure such as IH repair will only be reserved for more experienced residents, who completed their first several years of training.

This survey explored the current perspectives and challenges associated with the implementation of a Dutch national IH registry. Following these results, a multicenter pilot study will be conducted to evaluate the feasibility of this registry, including the most important process and outcome indicators and PROMs. The hospital's EMR will be used as the system to collect all necessary information. While this survey provided valuable insights into the perceptions of Dutch surgeons regarding a national IH registry, limitations should be acknowledged: The surgeon's experience and volume were not taken into account. This may complicate generalizability of our results. Since the exact number of hernia surgeons in the Netherlands is unknown, verifying whether all stakeholders have participated in the survey was not possible. Nevertheless, 91% (n = 237) of the respondents perform IH repair, a number almost twice as large as the membership count of the Dutch Hernia Society, which accounts for 122 members. Therefore, the response rate has been assumed to be sufficient for our purpose: the first exploration of opinions regarding the DIHA.

Conclusion

In summary, the majority of Dutch surgeons who responded to the survey agree that the quality of IH care could be improved by implementing a national IH registry. CPIP and recurrence rate collected as PROMs are believed to be the most relevant quality indicators. A reliable, high-quality national IH registry will only be feasible if there is no additional administrative burden.

Author contributions

Burgmans and den Hartog conceptualized and designed the study. Den Hartog collected the data. Meuzelaar conducted the data analysis and drafted the manuscript. Critical revisions were provided by Meuzelaar, den Hartog, Tanis, Schiphorst, and Burgmans. All authors reviewed and approved the final manuscript.

Ethical policy and institutional review board statement

Not applicable.

Data availability statement

The datasets generated during and/or analyzed during the current study are available from the corresponding author on reasonable request.

Financial support and sponsorship

This study received no funding.

Conflicts of interest

Richtje R. Meuzelaar, Floris P.J. den Hartog, Pieter J. Tanis, Anandi H.W. Schiphorst and Josephina P.J. Burgmans declare no conflict of interest.

List of Abbreviations

AOK: German Local General Sickness Fund
CPIP: Chronic postoperative inguinal pain
DICA: Dutch Institute for Clinical Auditing
DIHA: Dutch Inguinal Hernia Audit
EMR: Electronic medical record
IH: Inguinal hernia
PROMs: Patient-reported outcome measures

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