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Dislocations Following Total Hip Arthroplasty via Direct Anterior Approach: A Retrospective Analysis of 2933 Cases with One-Year Follow-Up

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The direct anterior approach (DAA) for total hip arthroplasty (THA) has gained increasing popularity; however, the incidence, causes and outcomes of dislocations following THA are rarely studied. This study aims to evaluate the incidence, causes, and outcomes of dislocations following DAA THA.

This retrospective study included 2933 patients who underwent DAA THA for osteoarthritis between 2014 and 2019, with a one-year follow-up. Data were collected on dislocation rate, directions, timing, associated risk factors, and revision surgeries. Hip function outcomes were assessed using the Oxford Hip Score (OHS), comparing patients with and without dislocations.

The dislocation rate was 0.7% (n=21), with 81% of dislocations occurring in the anterior direction and 86% occurring within the first postoperative month. Dislocations were most commonly associated with sitting or rising from a seated position. Patients with dislocations had a higher mean Body Mass Index (29.6 vs 27.0 kg/m², p=0.007). Five patients (24%) required revision surgery. At one-year follow-up, no significant differences in OHS were observed between patients with and without dislocations.

Dislocation after DAA THA are rare, with the majority being anterior. Dislocations occur in different positions, but mostly in a seated position, suggesting that specific postoperative precautions may be unnecessary. Despite these dislocations, patients generally experience comparable hip function outcomes at one-year follow-up.

INTRODUCTION

In the Netherlands, the direct anterior approach (DAA) for total hip arthroplasty (THA) is gaining popularity In 2020, 41.2% of all procedures in the Netherlands were performed using the DAA, compared to 4.7% in 2010[1]. A similar trend has been observed in the United States, where utilization of the anterior approach increased form 12% in 2010 to an estimated 40% in 2018[2]. Current evidence does not demonstrate clear superiority of any surgical approach in terms of long term outcomes or complication rate[3,45], However, potentional advantages of the DAA include a faster short-term functional recovery and a lower dislocation rate[3,6-9]. Reported dislocation rates for the DAA range form 0.23 to 1.5%[10]. Dislocations following THA are associated with a significant clinical and economic burden. A study from the United Kindom reported that the median costsfor patients experiencing a dislocation was 228% higherthan for those without dislocation, and these patients demonstrated less improvement in quality of life and greater disability[11]. Therfore, identifying risk factors for dislocation is critical to developing strategies to migitate its occurence following THA.

Several patient-related factors, including prior hip surgery, lumbosacral pathology, advanced age, obesity, female sex, and comorbidity, as well as surgical related factors, such as surgeon experience, component positioning, femoral head size, and impingement have been identoified as potentioal risk factors for dislocation[10]. However, limited data exists on the specific circumstances under which the dislocations occur. Although no conclusive evidence supports the effectiveness of postoperative movement restrictionsin preventing dislocations, patients are commonly educated to avoid certain movements or daily activities, such as combined flexion, adduction and rotation or sleeping without an abduction pillow[12,13]. For the DAA specifically, patients are often instructed to avoid extension and external rotation. Horberg et al. (2021) studied dislocations following DAA THAin a non-selective cohort and found that the majority of dislocations (8/13) were in the anterior direction, but they did not describe the circumstances or contributing factors[8]. Currently, data on the mechanisms and direction of dislocations following DAA THA remain scarce, making it unclear whtether specific movements or activities contribute to dislocation risk.

Furthermore, little is known about the management of dislocations after DAA THA and the functional results following these interventions. Therefore, this study aims to provide a comprehensive overview of dislocations following DAA THA, adressing the following research questions: 1. What is the direction and cause for the dislocation? 2. What proportion of patients experience a recurrent dislocation following the first event? 3. How many patients require revision surgery after the initial dislocation? 4. What are the functional outcomes at 1-year follow-up (1y-FU) in different scenarios following dislocation?

MATERIALS AND METHODS

For this retrospective study, we included all patients who had THA via the DAA for a diagnosis of osteoarthritis (OA) at a single secondary care hospital in the Netherlands between January 1 2014 untill April 30 2019. Patients who underwent THA using other surgical approaches or for other diagnoses were excluded.

During the study period, 7 orthopedic surgeons performed the procedure of interest. The DAA was the standard approach at our hospital, and all patients followd a “Rapid Recovery” protocol. Preoperatively, patients attended a group meeting with a physiotherapist, where they were informed about the low risk of dislocation. Consequently, no general activity restrictionswere imposed on activities of daily living. However, patients were advised to avoid extreme external rotation combined with (hyper)extension iduring the first 6 weeks. Active and passive motion exercises, as well as full weight bearing, were permitted on the day of surgery. Most patients were discharged within 1 or 2 days postoperatively.

The Dutch Arthroplasty Register (LROI) was used as a data source. The LROI was consulted to generate a list of all patients with a DAA THA at our institution between January 1 2014 and April 30 2019. The following patient characteristiscswere extracted: age, gender, body mass index (BMI), American Society of Anesthesiologists (ASA) physical status classification, operated side (left/right), diagnosis and femoral head size. Additionally, electronic health records were reviewed to obtain more specific information on preoperative mobility, as well as pre- and postoperative pain and physical function.

Preoperative mobility was assesed using the Timed Up and Go (TUG) test, which was routinely performed by a physiotherapist. TUG data were available only for those patients undergoing elective THA (usually 6 weeks preoperative, with a maximum of 6 months before surgery). A TUG time exceeding 10 seconds has been associated with pooreroutcomes following THA[14]

Pain and physical function were assesed using the Oxford Hip Score (OHS), a patient reported outcome measure (PROMs). The OHS was routinely collected as part of usual care both preoperatively and postoperatively at one-year follow-up. OHS ranges from 0 to 48, with 0-19 indicating severe hip complaints, 20-29 moderate to severe hip complaints, 30-39 mild to moderate hip complaints and 40-48 satisfactory joint function. A change beyond 8 points is considered clinically relevant[15].

Our own complication registration was used to identify patients that experienced a dislocation during the study period and had a minimum follw-up of one year.

For all patients with dislocations, information regarding the cause, direction, timing and management of the dislocations, was collected. X-rays of all dislocations were evaluated by 2 specialized hip surgeons to dtermine the direction of the dislocation, asses (mal)positioning and identify other abnormalities. The use of additional imaging techniques was not standard procedure, but when available, they were included in the evaluation.

Data analysis was performed using SPSS version 27. Normality was assessed by means of plots. To compare groups, Chi square statistics, including risk analysis, were used in case of categorical variables, while independent t-tests were employed in case of numerical data. Statistical significance was set at $p < 0.05$. For dichotomous data, risk analyses with 95% confidence intervals (95% CI) were reported, and for continuous data, means with a 95% CI were provided.

Age and BMI were analyzed as continuous data and also categorized into clinical relevant groups. Age was classified into the following groups: <50, 50-59, 60-69, 70-79, 80-89 and >90 years old. BMI was categorized as recommended by the World

Health Organization: underweight (<18.5 kg/m2), normal weight (18.5–24.9), overweight (25.0–29.9), obesity class I (30.0–34.9), obesity class II (35.0–39.9) and obesity class III (> 40). Differences in sex and age were analyzed between responders and non-responders of the OHS to asses potential response-bias.

The study protocol was approved by the Beoordelingscommissie Wetenschappelijk Onderzoek Ziekenhuis Gelderse Vallei (BCWO ZGV; Scientific Assessment Committee Research Gelderse Vallei Hospital, number 1909-060) on September 5, 2019.The BCWO granted permission to conduct this retrospective study without requiring informed consent, as patients had the opportunity to object in advance to the storage of their data in the LROI database. This approval was granted on the condition that only the researchers involved would extract and view the data from the database and that the data would be stored and analyzed in a coded manner after data extraction. This study complied with the principles outlined in the Declaration of Helsinki. The STROBE guidelines were followed in drafting this manuscript. This research did not receive any specific grants from funding agencies in the public, commercial, or not-for-profit sectors. The authors declare no conflicts of interest related to this manuscript. Data can be made available upon request to the corresponding author.

RESULTS

The LROI generated a database of 3420 THA's of which 3207 were performed using the DAA. A total of 213 THAs performed using other approaches were excluded. Postoperative hip dislocation was observed in 29 of 3207 patients (0.9%) in the DAA THA population across all diagnoses. Subsequently, 274 patients who underwent THA for indications other than OA were excluded.

The final database consisted of 2933 patients who underwent DAA THA for OA, with a dislocation incidence of 0.7% (21/2933, Figure 1). 15 patients experienced a single dislocation, while 6 patients had a second dislocation (29%), including 1 patient with a third dislocation. The median FU duration was 26 months (range 12-52 months).

Characteristics of patients with and without dislocation in the OA-group are presented in Table I. Both orthopedic surgeons who reviewed the X-rays agreed that malpositioning was present in 3 cases.

Direction and timing of the dislocations

Of the dislocations, 81% (17/21) were in the anterior direction, and 86% (18/21) occurred within the first postoperative month (Table II). In three cases, the

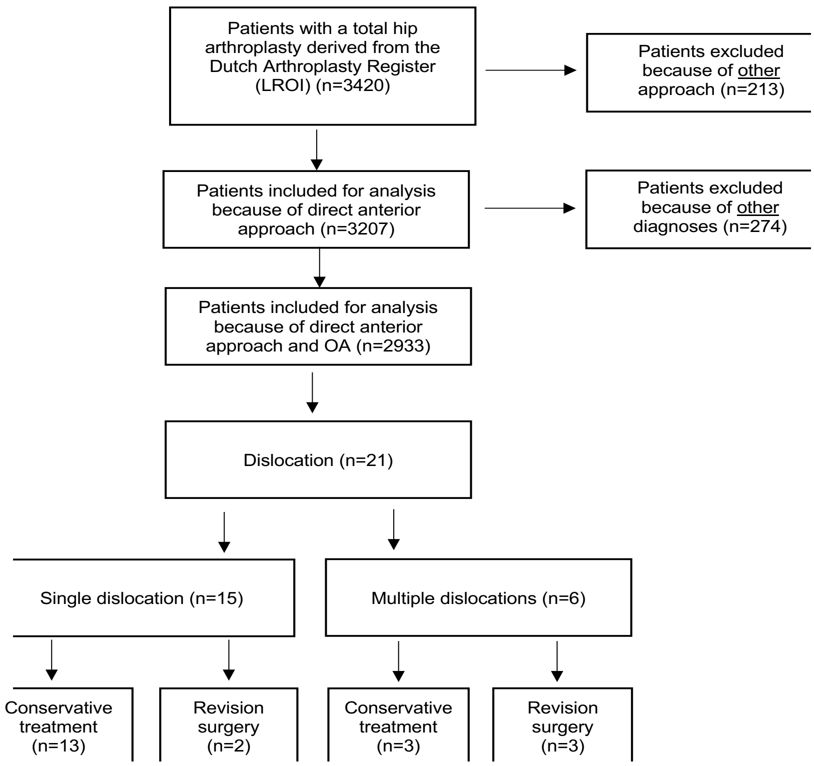

Fig. 1 — Flowchart of the study population, the dislocations and treatment after dislocation.

Table I. — Characteristics of patients without and with dislocation (n=2933).

		No-dislocation n=2912	Dislocation n=21
Age during surgery	Mean (SD)	70 (9)	68 (10)
Sex, female	no. (%)	2010 (69%)	17 (81%)
BMI *	Mean (SD)	27 (4)	30 (4)
BMI categories *	no. (%)		
	Underweight	23 (1%)	0
	Normal weight	907 (31%)	3 (14%)
	Overweight	1342 (46%)	6 (29%)
	Obesity I	476 (16%)	10 (48%)
	Obesity II	136 (5%)	2 (10%)
	Obesity III	28 (1%)	0
Smoking, no	no. (%)	2658 (91%)	17 (81%)
ASA-score	no. (%)		
	I	612 (21%)	7 (33%)
	II	1816 (62%)	11 (53%)
	III-IV	484 (17%)	3 (14%)
Femoral head size	no. (%)		
	28 mm	500 (17%)	7 (33%)
	32 mm	1667 (57%)	11 (52%)
	36 mm	744 (26%)	3 (14%)
OHS preoperative	Mean (SD)	25 (9)	26 (7)
OHS 1 year postoperative	Mean (SD)	44 (6)	42 (7)
Improvement OHS preoperative- 1 year postoperative	Mean (SD)	18 (9)	16 (6)
TUG preoperative, sec.	Mean (SD)	11 (7)	11 (5)

BMI=Body Mass Index, ASA=American Society of Anesthesiologists physical. Status classification system, OA=osteoarthritis, TUG=Timed Up and GO, OHS=Oxford Hip Score. *$p < 0.05$

Table II. — Timing, direction and causal movements of first, second, and third dislocation.

		1st dislocation		2nd dislocation		3rd dislocation
		Anterior	Posterior	Anterior	Posterior	Anterior
	N total	17	4	3	3	1
Time between surgery and dislocation (no.)	< 1 week	3	0	1	0	0
	Between 1st week and 1st month	11	4	1	3	1
	Between 1st month and 2nd month	2	0	1	0	0
	> 2 months	1	0	0	0	0
Causal movement (no.)	Sitting and turning	5	1	1	0	0
	From sitting to standing	1	2	0	1	0
	Sitting	3	0	1	0	1
	Fall	1	0	0	0	0
	Turning while lying down	2	0	1	0	0
	Deep flexion	0	1	0	1	0
	Stretching out	1	0	0	0	0
	Transfer	1	0	0	0	0
	Walking	1	0	0	1	0
	Unclear	2	0	0	0	0

OA=osteoarthritis.

dislocation occurred in the hospital on the day of surgery or the first postoperative day. Only one patient experienced a dislocation in the very long term after a fall (1351 days postoperatively).

Occasions of the dislocations

Most dislocation occurred when patients were sitting, sitting and turning or getting up from a chair (Table II). We identified possible surgical-related factors that contributed to dislocation in six cases: impingement (n=1), a trochanter fracture during primary surgery (n=2) and malposition (n=3).

Risk factors for dislocation

Patients who experienced a dislocation had a higher BMI than those who did not (29.6 vs 27.0 kg/m2, 95% CI -4.4 to -0.7, p = 0.007). The incidence of dislocations was highest in the BMI group 30-35 kg/m2 (2.3%, Table 3). Furthermore, most dislocations occurred in the 70-79 years age group years (Table III), which No significant differences in other variables were found between patients with and without dislocation.

Multiple dislocations

A total of 29% (6/21) of the patients with a dislocation experienced a second dislocation. Both patients with a trochanter fracture during primary surgery had a second dislocation. Additionally, one patient with a second dislocation had a trochanter fracture after the first dislocation. In the other 3 patients with multiple dislocations, no surgical-related risk factors were reported. Characteristics of patients with single and multiple dislocations are reported in Table IV.

Patients who initially experienced a posterior dislocation were more likely to have a second dislocation compared to those with an initial anterior dislocation (relative risk 4.3, 95% CI 1.3 to 13.7, p=0.022). Furthermore, patients with multiple dislocations had lower TUG scores (15 vs 10 sec, 95% CI -0.1 to 9.7, p=0.046) and tended to be older (73 vs 66 years, 95% CI -13.0 to 0.4, p=0.18).

Treatment

Among patients with a dislocation, 76% (16/21) received conservative treatment, including two2 patients who were treated with a hip immobilizer after experiencing a second and third dislocation. The remaining 24% (5/21) underwent revision surgery. the overall revision rate for instability was 0.2% (5/2933).

Revision surgery was performed in 2 cases on postoperative day 2, while the remaining cases underwent revision at 23, 49 and 184 days after primary surgery.

Characteristics of patients without revision and with revision surgery are reported in Table V.

Direction of the first dislocation was associated with occurrence of revision surgery: more patients with a first dislocation in the posterior direction underwent revision surgery than those with a first anterior dislocation (relative risk 9.6, 95% CI 1.3 to 73.0, p=0.008).

Age, TUG and number of dislocations were not (statistical) significantly associated with revision risk, but may be clinically relevant. Patients with revision surgery were older (73 vs 67, 95% CI -3.9 to 16.6, p=0.21) had lower TUG scores (16 vs 10 sec, 95% CI -7.0 to 17.8, p=0.26). Patients with multiple dislocation had more often revision surgery (relative risk 3.7, 95% CI 0.8 to 17.1, p=0.075).

Outcome at 1 year follow-up

OHS response rates were 86% preoperatively and 76% postoperatively in the total population and 90% and 71% respectively in the dislocation group.
No significant differences were found in OHS outcomes between patients with or without dislocation (Table I).

Patients with revision surgery (n=5, 4 post-OHS completed) had a significant lower post-OHS compared to those without dislocation (38 vs 44, 95% CI 0.1 to 12.1, p=0.045) b. No dislocations were reported after revision surgery.

Table III. — Dislocation rate by age groups and BMI groups in patients.

Age groups	Total	<50	50-59	60-69	70-79	80-89	≥90
Number of THAs (n, %)	2933	65 (2%)	312 (10%)	924 (32%)	1166 (40%)	446 (15%)	20 (1%)
Dislocation rate, n (incidence)	21 (0.7)	1 (1.5)	2 (0.6)	6 (0.6)	11 (0.9)	1 (0.2)	0
Direction 1st dislocation, anterior, n	17	1	2	6	7	1	0
Patients with a 2nd dislocation, n	6	0	0	1	5	0	0
Revision for dislocation, n	5	0	0	1	4	0	0
BMI groups	**Total**	**Underweight (<18,5)**	**Normal weight (18.5-25)**	**Overweight (25-30)**	**Obesity (30-35)**	**Obesity II (35-40)**	**Obesity III (>40)**
Number of THAs (n, %)	2933	23 (1%)	910 (31%)	1348 (46%)	486 (17%)	138 (5%)	28 (1%)
Dislocation rate, n (incidence)	21	0	3 (0.3)	6 (0.4)	10 (1.9)	2 (1.4)	0
Direction 1st dislocation, anterior, n	17	0	3	5	7	2	0
Patients with a 2nd dislocation, n	6	0	0	1	5	0	0
Revision for dislocation, n	5	0	0	2	3	0	0

THA=Total Hip Arthroplasty.

Table IV. — Characteristics of patients with a single dislocation and multiple dislocations.

		1 dislocation (n=15)	Multiple dislocations (n=6)
Preoperative factors			
Age	Mean (SD)	66 (11)	73 (4)
Sex, female	no. (%)	12 (80%)	5 (83%)
Smoking, no (1 missing)	no. (%)	12 (86%)	5 (83%)
BMI, kg/m^2	Mean (SD)	29 (5)	31 (1)
ASA-score	no. (%)		
	I	6 (40%)	1 (17%)
	II	8 (53%)	4 (67%)
	III-IV	1 (7%)	1 (17%)
TUG preoperative, sec. (4 missing) *	Mean (SD)	10 (3)	15 (7)
Femoral head size	no. (%)		
	28 mm	4 (27%)	3 (50%)
	32 mm	9 (60%)	2 (33%)
	36 mm	2 (13%)	1 (17%)
Dislocation information			
Direction, posterior *	no. (%)	1 (7%)	3 (50%)
Primary malposition (yes)	no. (%)	3 (20%)	0 (0%)
Timing	no. (%)		
< 1 week		2 (13%)	1 (17%)
Between 1st week and 1st month		10 67%)	5 (83%)
Between 1st month and 2nd month		2 (13%)	0 (0%)
> 2 months		1 (7%)	0 (0%)
Outcome			
OHS preoperative (2 missing)	Mean (SD)	26 (6)	26 (9)
OHS 1 year postoperative (6 missing)	Mean (SD)	44 (4)	35 (9)
Change pre-post OHS (6 missing)	Mean (SD)	18 (5)	12 (8)
Revision surgery	no. (%)	2 (13%)	3 (50%)

OA=osteoarthritis, BMI=Body Mass Index, ASA=American Society of Anesthesiologists physical status classification system, TUg= Timed Up and Go, OHS=Oxford Hip Score. *$p < 0.05$

DISCUSSION

In this study, we evaluated the incidence of dislocations following DAA THA in an unselected cohort of patients who operated by 7 different orthopedic surgeons. The overall incidence of hip dislocation diagnosed with OA was 0.7, which is consistent with findings of previous studies[8,9]. Our findings confirm that the majority of first-time dislocations (86%) occurred within the first month postoperatively[9,16]. Additionally, obesity was associated to an increased risk of dislocation, as reported in other studies17. However, no dislocations were observed in patients with a BMI>40 kg/m2.

While many previous studies focus on prothetic information and other orthopedic factors, our reserach also examines potential causes of dislocation, treatment strategies and functional outcomes.

The majority of dislocations occurred in the anterior direction (17/21). Similarly, Horberg et al. (2021) reported that the most of their reported dislocations (8/13) were anterior[8]. However, Barnett et al. (2016) documented a higher prevalence of posterior dislocations (10/12) following DAA THA6. Based on our findings, most dislocations could not be explained by surgical or mechanical reasons, so the majority of dislocations occurred as a result of routine movements. Although we initially hypothesized that most anterior dislocations would occur due to extreme external tation and hyperextension, we found that most dislocations happened while patients were sitting or turning in a seated position. Patients often could not recallthe exact movement that led to dislocation. We propose that the edge of the chair may act as a lever when patients extend their operated leg on the chair, possibly in combination with external hip rotation, and lean back. Additionally, it is important to note thatdeterming the direction of the dislocation based on X-ray may not always be reliablea s it provides only a static evaluation.

In patients with OA, the likelyhood of experiencing a second dislocation was 29%, increasingto 75% for those ahose inital dislocation was posterior.

Table V. — Characteristics of patients without revision and with revision surgery.

		Without revision surgery (n=16)	With revision surgery (n=5)
Preoperative factors			
Age, years	Mean (SD)	67 (10)	73 (7)
Sex, female	no. (%)	13 (81%)	4 (80%)
Smoking, no	no. (%)	13 (81%)	4 (80%)
BMI, kg/m^2	Mean (SD)	29 (5)	31 (2)
ASA-score	no. (%)		
	I	6 (38%)	1 (20%)
	II	9 (56%)	3 (60%)
	III-IV	1 (6%)	1 (20%)
TUG preoperative, sec. (4 missing)	Mean (SD)	10 (3)	16 (8)
Femoral head size	no. (%)		
	28 mm	6 (38%)	1 (20%)
	32 mm	8 50%)	3 (60%)
	36 mm	2 (13%)	1 (20%)
Dislocation information			
Direction, posterior	no. (%)	1 (6%)	3 (60%)
Primary malposition (yes)	no. (%)	1 (6%)	1 (20%)
Timing	no. (%)		
< 1 week		1 (6%)	2 (40%)
Between 1st week and 1st month		12 (75%)	3 (60%)
Between 1st month and 2nd month		2 (13%)	0 (0%)
> 2 months		1 (6%)	0 (0%)
Outcome			
OHS preoperative (3 missing)	Mean (SD)	27 (6)	24 (9)
OHS 1 year postoperative (6 missing)	Mean (SD)	43 (5)	38 (9)
Change pre-post OHS (7 missing)	Mean (SD)	16 (6)	14 (8)

BMI=Body Mass Index, ASA= ASA=American Society of Anesthesiologists physical. Status classification system OHS=Oxford Hip Score, OA=osteoarthritis, TUG=Timed Up and Go, CRT=Chair Rise Time.

Probably soft tissue laxity or muscle weakness may play a more prominent role in reccurrent posterior dislocations compared to the anteriorones. Patients who experienced a second dislocation were generally older, more frequently obese and had poorer preoperative mobility. However, these differences were not statistically significant. Again, this could be associated with soft tissue laxity and/or muscle weakness. Malpositioningdid not appear to be a major factor in reccurrent dislocations within our cohort. Notably, 2 out of 3 patients with malpositioning did not experience a second dislocation and had a favorable recovery following conservative treatment. Although our sample size was too small to draw definitive conclusions, our findings indicate that increased caution may be warranted following an initial dislocation, particularlyin patient with a posterior dislocation, advanced age, poor mobility, or obesity.

In our cohort, the revision rate following a dislocation was 24%. The overall revision rate due to instability was 0.2%, which is slightly lower than the revision rate reported by Ponzio et al. (2018). However, their study had a follow-up period of 4 years compared to 1 year in our study[18].

At one-year follow-up, mean outcomes were comparable between patients with and without a history of dislocation, though no statiscally significant differences were observed. However, patients without a dislocation more frequently reported meaningful improvement and satisfactory joint function, as assesedby the OHS at 1y-FU. In contrast, previous studies that did not focus on a specific surgical approach have reported signifciantly better outcomes in patients without a dislocation compared to those who experienced a dislocation10,18. The mean OHS of 43 observed in patientswho underwent conservative treatment following a dislocation is comparable to the mean OHS of 42.6 reported for all patients who underwent a THA for OA in the Netherlands in 2014-2020[1].

As expected, outcomes were most favorable in patients who had a single dislocation managed conservativly. Patients requiring revision surgery tended to be older, had poorer preoperative mobility and were more often with obese, or affected by other complications or comorbidities. These factors likely contributedto their less favorable outcome. Additionally, some patients with moderate hip complaints, as inidcatedby the OHS, still reported satifactory functional recovery at 1y-FU, suggesting that may have adjusted their expectations following a complicated course.

Overall, our findingsindicate that good joint function is achievable after a dislocation. However, discussing patient expectations and the possibilitiy of suboptimal outcomes may be beneficial, particularly for those with multiple dislocations, those requiringrevision surgery and older and more vulnerable patients.

This study has some limitations. Firstly, it is uncertain whether all dislocations within our patient population were reported at ourhospital. However, we think this is unlikely that we missed cases, because all patients were invited for a FU in our hospital at 6 weeks and 1 year. These follow-up moments should have identified most dislocations, including those treated externally. Secondly, while we included a large cohort, the relatively low incidence of dislocations limits the sample size of patients with a dislocation. As a result we may not have accountedfor all factors contributing to dislocation prevention[10]. Additionally, the small number of dislocations restricts our ability to confirm certain hypothesized relationships between causes, risk factors and treatment results. Therefore, all (statistically significant) findings should be interpretated with caution. We recommend further evaluation of dislocation risk n DAA THA using a larger multicentre database. Thirdly, a CT imaging could provide a more objective and comprehensive assesment of the prothesis positioning. However, we assume that the combination of clinical evaluation and X-ray imaging, reviewed in complication meetings with experienced orthopaedic surgeons, is sufficient in most cases to make an appropriate treatment plan. Laslty, the study was conducted in a single hospital, which limits the generalizability of the findings.

As our focus was on functional causes and results, the findings from our cohort may have relevant implications fot clinical practice. By including a consecutive non-selective cohort of 2933 patients treated by 7 different orthopedic surgeons, we minimized selection bias, thereby enhancing the generalizibility of the results.

Although current consensus is that omitting postoperative precautions does not lead to a higher dislocation rate1, a recent survey among Dutch hospitals revealed that 69% of the 13 hospitals performing the DAA still impose restrictions. These restrictions often aim to prevent a posterior dislocation and may include limitations for flexion, adduction, external or internal rotation, or functional restrictions such as sleeping with an abduction pillow[20]. Given the broad variability in dislocation mechanisms and the relatively low numbers, it seems unlikely that specific lifestyle restrictions effectively prevent dislocations. Furthermore, existing evidence indicates that eliminating restrictions results in faster return to daily activities, reduced healthcare costs and improved patient satisfaction[12,13].

Due to the heterogeneity of dislocation causes, treatment approaches and outcomes, we believe that there is no single optimal treatment algorithm; each case should be assesed individually. Particular attention may be warranted for subgroups such as patients experiencing a first posterior dislocation or those with limited mobility, obesity or advanced age.

For future research, we recommend the use of PROMs along with performance-based assesments, such as the TUG pre- and postoperatively. These tools can aid in identifying risk factors and monitoring outcomes in patients with dislocations.

CONCLUSION

In this study, we obtained valuable insights into the incidence, causes, treatment, and outcomes in dislocations following DAA THA. We observed a low dislocation rate in patients with OA (0.7%) with the most dislocations occuring in the anterior direction and in a sitting position. Obesity was identified as a risk factor for dislocation. The risk of multiple dislocations (29%,) or revision surgery (24%) following a first dislocation is relatively low. However, patients experiencing a first posterior dislocation are at increased risk for recurrent dislocation and revision surgery. Despite this, clinical outcomes can remain favorable; OHS at one-year follow-up were comparable in patients who received conservative treatment after dislocation.

These findings may inform clinical decision-making and patiënt counseling following a dislocation.

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