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ORIGINAL STUDY

Hip abduction pillow use following total hip arthoplasty does not decrease acute hip dislocation rates

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Dislocation following total hip arthroplasty (THA) is a complication with reported incidence rates varying from 0.5% to 10.6%. Post-operatively, placement of an abduction pillow is routinely undertaken to restrict hip movement as a precautionary measure to help prevent acute hip dislocation. Several recent prospective studies have however reported no increase in dislocation rates following non-restrictive protocols. Our primary aim is to compare the rates of acute hip dislocation between THA patients who received a post-operative hip abduction pillow (June 2014 - June 2016) and patients who did not receive a post-operative hip abduction pillow (June 2016- June 2018). This is a retrospective single-center, multi-surgeon case-series of patients who underwent primary THA between June 1, 2014, and June 01, 2018 at our National Orthopaedic Hospital. Exclusion criteria included revision surgery, conversion surgeries and patients who inadvertently received hip abduction pillows despite institutional change in protocol. Pearson's chi-square test was used to compare dislocation rates between the 2 groups: reported as relative risk (RR) estimates with 95% confidence intervals (CIs) and P-values as appropriate. 1154 patients received hip abduction pillows following THA in the period June 2014-to June 2016. 1296 patients did not receive hip abduction pillows following THA from June 2016 to June 2018. Two patients suffered an acute hip dislocation in the period June 2014-June 2016) with 1 patient suffering an acute hip dislocation in the period June 2016- June 2018. The relative risk of suffering an acute hip dislocation was 2.25 times higher if the hip abduction pillow was utilized. Removal of the hip abduction pillow following primary total hip arthroplasty does not increase the risk of in-hospital acute hip dislocation, regardless of approach used.

Abbreviations : THA : Total Hip Arthroplasty ; RR : Relative Risk ; CI : Confidence Interval.

Keywords : Hip abduction pillow ; dislocation ; arthroplasty.

INTRODUCTION

Dislocation following total hip arthroplasty (THA) is a complication with reported incidence rates varying from 0.5% to 10.6% *(6)*. Myriad factors contribute towards dislocation following THA including surgical approach, component malposition, soft-tissue related factors and patient-related factors *(1,4,9,13)*. Post-operatively, placement of an abduction pillow is routinely undertaken to restrict hip movement as a precautionary measure to help prevent acute hip dislocation *(3)*.

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Over the past decade, authors have questioned the effectiveness of post-operative hip restrictions, with several prospective studies reporting no increase in dislocation rates following non-restrictive protocols *(14,17,18)*. Furthermore, several authors have found a speedier recovery and less time off work for patients who are not prescribed hip restrictions post-operatively *(2,10)*. The majority of prospective data has focused on patients who have undergone THA via an anterolateral or anterior approach *(14,17,18)*. A prospective trial examining the effect of hip restrictions on posterolateral THA patients is currently in progress *(15)*. Currently, the majority of surgeons continue to recommend post-operative hip restrictions as a precautionary measure in this sub group *(16)*.

The main aim of this retrospective study is to compare the rates of acute hip dislocation between THA patients who received a post-operative hip abduction pillow (June 2014 - June 2016) and patients who did not receive a post-operative hip abduction pillow (June 2016- June 2018). Acute hip dislocation was defined as one that occurred while an inpatient in our institution. All patients who underwent a primary THA for primary osteoarthritis in our institution from June 2014 to June 2018 inclusive were eligible for inclusion. We aim to compare all surgical approaches utilized in our institute including the posterolateral and direct lateral approaches. The direct anterior approach is not carried out in our institution.

METHODS AND MATERIALS

Patient Data

This is a retrospective single-centre, multi-surgeon case-series of patients who underwent primary THA between June 1, 2014, and June 01, 2018 at Cappagh National Orthopaedic Hospital, Dublin. Exclusion criteria included revision surgery, conversion surgeries and patients who inadvertently received hip abduction pillows despite institutional change in protocol. Patient data was retrospectively collected via extrapolation from our institutional hip registry of which a specific alert exists for identification of in house dislocation. Patient demographics were identified, surgical approach confirmed, as well as femoral head size, and dislocation rates. The study cohort consisted of 2450 primary total hip arthroplasties.

THA was performed by 19 Attending Orthopaedic surgeons. All patients were placed in a lateral decubitus position with the majority of patients receiving regional spinal anaesthetic. General anesthetic was utilized when necessary. Surgical approach and component placement were dependent on the surgeons' preference. The posterolateral approach, and direct lateral approach were both utilized in our institute. Uncemented, cemented and hybrid components were all eligible for inclusion.

Primary THA performed on patients before June 1, 2016 received a post-operative hip abduction pillow routinely. Patients receiving primary THA following June 1, 2016 did not receive a post-operative hip abduction pillow in line with institutional protocol. This protocol was in place for all patients regardless of surgical approach.

Outcome Measures

The primary outcome measure of this study was to identify the acute hip dislocation rate in primary THA patients who were not prescribed a post-operative hip abduction pillow and compare this to the rate to acute dislocation rate in patients who were prescribed a post-operative hip abduction pillow.

Statistics

Pearson's chi-square test was used to compare dislocation rates between the 2 groups: reported as relative risk (RR) estimates with 95% confidence intervals (CIs) and P-values as appropriate.

RESULTS

The mean age of patients who presented for THA in our institute 64 years old for both periods (June 2014-June 2016 and June 2016- June 2018), (Table I). More male patients than female patients presented for THA between June 2014-June 2016 (593 compared to 561). More female patients than male patients presented for THA between June 2016-June 2018 (683 compared to 613).

Two patients suffered an acute hip dislocation in the period June 2014-June 2016 with 1 patient suffering an acute hip dislocation between June 2016 and June 2018, (Table II.)

The relative risk of suffering an acute hip dislocation was 2.25 times higher if the hip abduction pillow was utilized, (Table II). The most common femoral head size was size 32 in both recorded periods, (Table III). The posterolateral approach was the most common approach to the hip in both recorded periods, (Table III).

Table I. — Patient demographics.

	With hip abduction pillow (June 2014-June 2016)	Without hip abduction pillow (June 2016- June 2018)
Age +/- SD	64 +/- 13.1	64 +/- 12.5
Gender		
Male (%)	593 (51.4%)	613 (47.3%)
Female (%)	561 (48.6%)	683 (52.7%)
Total	1154	1296

Table II. — Patient demographics.

	Dislocations with abduction pillow n/N (%)	Dislocations without abduction pillow n/N (%)	Risk of dislocation RR (95%CI)	Test for difference P-value[a]
Total	2/1154 (0.17%)	1/1189 (0.08%)	2.25 (0.30 to 17.4)	0.60

DISCUSSION

Acute hip dislocation has been reported to occur in 0.5% to 10.6% of all patients undergoing primary THA *(6)*. Risk of dislocation is at its highest in the first 3 months following surgery *(7,21)* and tends to occur most often along the direction of the surgical approach *(12)*. Failure of soft-tissue repair has thus been identified as a major contributing factor towards the development of acute hip dislocation *(11)*. Hip restrictions including the use of high chairs, toilet seats, and hip abduction pillows have been traditionally implemented to help protect soft-tissue repair *(9)*. Although prescribed in good faith, hip abduction pillows can be a source of displeasure for patients and contribute towards an economic and environmental burden for the institute in question *(17)*.

Table III. — Femoral head sizes and hip approach for patients with and without use of post-operative hip abduction pillow.

	With hip abduction pillow (June 2014-June 2016)	Without hip abduction pillow (June 2016-June 2018)
Femoral Head Size, mm (%)		
22	53 (4.6%)	41 (3.2%)
28	269 (23.3%)	237 (18.3%)
32	672 (58.2%)	835 (64.4%)
36	160 (13.9%)	183 (14.1%)
Approach (%)		
Direct Lateral	172 (14.9%)	174 (13.4%)
Anterolateral	110 (9.5%)	166 (12.8%)
Posterolateral	872 (75.6%)	956 (73.8%)

Our study has found that hip abduction pillows prescribed post-operatively to patients undergoing primary THA do not decrease one's risk of acute hip dislocation. Furthermore, we have found this to be true regardless of surgical approach. Acute hip dislocations occurred in 2/1154 patients who were prescribed hip abduction pillows compared to 1/1296 patients who were not prescribed hip abduction pillows. Our findings are in keeping with previous authors who have found no increase in dislocation rate when hip restrictions had been lifted post-operatively *(5,10,14,17,18)*.

Peak et al. prospectively randomized primary THA patients (via an anterolateral approach) into 2 groups: 1 group receiving hip abduction pillows, elevated toilet seats and elevated chairs with instructions not to sleep on one's side post-operatively with the second group not having the above prescribed *(14)*. Removal of these restrictions did not increase the prevalence of dislocation in this study cohort *(14)*. Similar results were identified by Talbot et al. when hip restrictions were lifted *(20)*. Talbot et al. found a similar dislocation rate in primary THA patients who were not prescribed hip abduction pillows or further devices such as elevated chairs or toilet seats *(20)*. The author does however stipulate caution in translating these results to other approaches *(20)*.

Traditionally, the posterolateral approach has been associated with higher dislocation rates than the anterolateral or direct lateral approaches *(19)*. Recent meta-analyses have however shown a similar dislocation rate between all approaches when adequate soft tissue repair has been performed *(8)*. None the less, a certain hesitancy persists regarding the abolition of hip restrictions in this cohort *(7)*. In our study we identified the risk of dislocation amongst all surgical approaches performed at our institute. We found no increased risk of dislocation when post-operative hip abduction pillows were not prescribed for patients undergoing THA via a posterolateral approach.

Gromov et al. retrospectively assessed the rates of acute hip dislocation in patients who underwent primary THA via a posterolateral approach with and without hip restrictions and devices such as the hip abduction pillow *(5)*. No increase in dislocation prevalence occurred in the non-restricted group compared to the restricted group although dislocation rates of over 3% occurred in each group *(5)*. In our study dislocation rates less than 0.2% occurred in each group. This may be as a result of the time period used to capture "acute dislocation": present as a hospital inpatient in our study compared to 90 days reported by Gromov et al. *(5)*.

Removal of the hip abduction pillow may have other benefits for THA patients. Peak et al. identified an improved satisfaction rate amongst patient at 6 months when hip abduction pillows had not been prescribed *(14)*. Furthermore, Ververeli et al. identified a faster recovery and shorter time to return to work in patients with lessened hip restrictions 18. Due to the low dislocation rate present in this study, we cannot draw the conclusion that femoral head size effects dislocation rate. Further prospective trials helping to delineate same are currently in progress *(15)*.

There are several limitations of our study. Firstly, although hip abduction pillows were utilized in our institute in the period June 2014-2016, one cannot presume a 100% compliance rate amongst patients. Peak et al. identified a 74% compliance rate for restrictions following THA *(14)*. Secondly, it is possible that the short-term identification of hip dislocations in this study was not long enough to capture the true rate of acute hip dislocation. This may explain the 3% rate of dislocation reported by Gromov et al. following 90 days of follow up *(5)*. Lastly this is a retrospective case series of patients. It is possible that we may be comparing more traditional surgical techniques in the restricted cohort of patients compared to the more recent cohort.

CONCLUSION

While α-defensin testing has been shown to be highly predictive of PJI, the results of its utilisation in primary joints should be interpreted with caution.

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