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# Pregnancy Does Not Adversely Affect Post-Operative Pain and Function In Women With Total Hip Arthroplasty

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## To the Editor

Changing indications and utilization patterns have resulted in shifting demographics of patients receiving total hip arthroplasty (THA) to include younger patients, including women of child-bearing potential [1-3]. There have been concerns that pregnancy following THA could result in prosthetic loosening, dislocation, pain or functional impairment [4].

While several case series report successful pregnancies following THA [4-8], less is known about the effects of pregnancy on pain or function associated with the maternal hip prosthesis. Using a well-characterized cohort from a THA registry at a single high-volume specialty hospital, we compared pre- and post-operative measures of pain and function in three groups of women: those with only pre-THA pregnancies, those with pregnancy post-THA and those without any pregnancy. Our primary objective was to compare post-operative pain and function in women with different pregnancy histories

Women age 18-45 years-old enrolled in an institutional THA registry from 2007-2011 were identified. Subjects had pre-operative pain and function data collected as part of the registry. For this study, subjects received a questionnaire eliciting pregnancy history (defined as gestation lasting >30 weeks) with additional questions about post-arthroplasty pain and function.

The primary outcomes of interest were post-operative Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) pain and function scores, (0-100, with higher scores indicating better function and less pain) [9]. Secondary objectives included pregnancy outcomes, comparing those who had pre-THA pregnancy to post-THA pregnancy.

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Of 325 eligible women undergoing THA in the study period, 171 women (52.6%) responded to the pregnancy-focused questionnaire. Comparing responders to non-responders there were no statistically significant differences between groups in terms of demographics or preoperative baseline WOMAC pain and function scores. Of the responders, 79 women (46.2%) reported being nulliparous, 82 (47.4%) had pregnancy pre-THA, and 10 (6.4%) had a completed pregnancy post-THA. Four women had both pre and post-THA pregnancies and were included in the post-THA group. There were no difference in baseline demographics or pre-operative WOMAN pain and function scores between the groups except that women with pregnancy pre-THA were older at time of THA (40.7 ±4.3years) compared to those with post-THA (38.5 ±3.8years) and no pregnancy (35.0 ±7.9years), p-value<0.001. (Table 1)

Women were assessed 12-72 months following THA, mean 36.9 ±18.2 months. Mean post-operative WOMAC pain scores were 87.5 ± 13.5. Women with no pregnancy had mean pain score of 85.2 ± 18.8, women with pre-THA pregnancy 84.9 ± 15.8, and those with post-THA pregnancy 92.5 ± 5.9. Mean post-operative function scores were 90.7 ± 14.6; 93.5 ± 6.4 for women with post-THA pregnancy, 91.1 ± 15.3 for those with pre-THA pregnancy, and 87.6 ± 22.1 for nulliparous women. There was no association between pregnancy category and post-THA pain or function score (p-value =0.4 and 0.39, respectively.) (Table 1)

Pregnancy-related outcomes were compared between subjects with pregnancy pre-THA and those with pregnancy post-THA. Women who reported pregnancy prior to arthroplasty were older at the time of arthroplasty and were younger at the time of delivery compared to those with post-THA pregnancy (33.3 ± 5.7 years vs 39.9 ± 5.0 years, p-value=0.01). There were no differences in reported weight gain during pregnancy (p-value=0.48) or weight of the baby (p-value=0.72) between pre-THA and post-THA pregnancies. For women with pre-THA pregnancy, the mean time from delivery to THA was 86.5 ± 67.0 months, while the mean time from THA to delivery in those with post-THA pregnancy was 26.9 ± 7.7 months. There were no differences in type of delivery in pre-THA versus post-THA pregnancies; in pre-THA pregnancies there were 52 (64%) vaginal deliveries, 20 (25%) elective Cesarean-sections and 7 (9%) unanticipated Cesarean-sections compared to 7 (70%) vaginal deliveries and 3 (30%) elective Cesarean-sections in post-THA pregnancies (p-value=0.74); these three women cited obstetrical reasons for Cesarean-section following THA. We also found no differences in pregnancy complications. (Table 2)

In our cohort of women undergoing THA, we found that post-operative pain and function, as defined by WOMAC scores, did not differ by timing of pregnancy. Women had similar levels of post-operative pain whether they had their pregnancy before or after THA. Though we had a small number of women with post-THA pregnancy, our study improves upon existing literature as we were able to compare post-THA patient-reported pain and function measures between women with different pregnancy histories. Consistent with previous studies, our results suggest vaginal delivery is safe in patients with THA [7].

A limitation of our study was insufficient follow-up time to detect a potential effect of pregnancy on need for future revision or implant durability. It is known from studies

assessing risk factors for revision following primary THA, female sex and younger age are independent risk factors for revision [11,12]. Nonetheless, in the largest reported series of post-THA pregnancy, Sierra et al concluded that pregnancy and childbirth were not independently associated with increased risk of THA revision or decreased survival of the prosthesis based on analysis of 343 women including 47 post-THA pregnancies [7].

A strength of this study was our ability to compare both pre and post-operative WOMAC scores using systematically collected data. This study also represents the most contemporary cohort in which the impact of pregnancy on THA was evaluated. All THA in our cohort were performed between 2007 and 2011, while prior studies reported on surgeries performed between 1975 and 2005 [4-8]. Older studies may not necessarily be generalizable to current patients due to changes in practice patterns, as well as advances in surgical and anesthetic techniques and implant design.

In conclusion, we found that pregnancy following THA was not associated with worse post-operative pain or function. Moreover, there was no difference in pregnancy outcomes or complications between women with post-THA pregnancy and those with pregnancy pre-THA. Though these conclusions are drawn from a small sample of women, this may be important information to discuss with women of childbearing age who are contemplating THA and those with THA considering pregnancy.

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## Table 1

### Demographics

| | No pregnancy (N=79) | Pregnancy pre - THA (N=82) | Pregnancy post - THA (N=10) | P-value |
|---|---|---|---|---|
| **Age at time of THA, years (SD)** | 35 (7.9) | 40.7 (4.3) | 37.3 (4.3) | <0.001 |
| **Months from THA to survey response, months (SD)** | 36.5 (27.3) | 34.9 (11.7) | 39.5 (15.6) | 0.24 |
| **BMI pre-operative, mean (SD)** | 25.6 (5.9) | 25.4 (4.9) | 23.6 (2.0) | |
| **Race, n (%)** | | | | 0.35 |
| **Caucasian** | 63 (81) | 69 (85) | 9 (90) | |
| **Hispanic, n (%)** | 12 (16) | 6 (8) | 1 (10) | 0.29 |
| **Education level, n (%)** | | | | 0.83 |
| **High school** | 4 (6) | 4 (6) | 2 (20) | |
| **College graduate/advanced degree** | 50 (63) | 53 (65) | 5 (50) | |
| **Reason for THA surgery, n (%)** | | | | 0.17 |
| **Inflammatory arthritis** | 24 (30) | 12 (15) | 4 (40) | |
| **Osteoarthritis** | 18 (23) | 24 (30) | 3 (30) | |
| **Fracture** | 4 (5) | 4 (5) | 1 (10) | |
| **Congenital hip dysplasia** | 21 (27) | 25 (31) | 2 (20) | |
| **Osteonecrosis** | 10 (13) | 16 (20) | 0 | |
| **Other** | 2 (2) | 0 | 0 | |
| **Primary THA, n (%)** | 67 (85) | 77 (96) | 10 (100) | 0.31 |
| **Deyo comorbidity** | | | | 0.69 |
| **0** | 61 (78) | 66 (84) | 5 (83) | |
| **>1** | 17 (22) | 13 (16) | 1 (17) | |
| **WOMAC pain** | | | | |
| **Pre-THA, mean (SD)** | 50.5 (20.2) | 50.4 (18.0) | 60.0 (15.8) | 0.61 |
| **Post-THA, mean (SD)** | 85.2 (18.8) | 84.9 (15.8) | 92.5 (5.9) | 0.4 |
| **WOMAC function** | | | | |
| **Pre-THA, mean (SD)** | 48.9 (20.3) | 51.7 (18.3) | 54.7 (15.8) | 0.63 |
| **Post-THA, mean (SD)** | 87.6 (22.1) | 91.1 (15.3) | 93.5 (6.4) | 0.39 |
| **Expectation score, mean (SD)** | 81.1 (14.7) | 86.5 (12.9) | 86.8 (12.8) | 0.13 |
| **Overall THA satisfaction** | | | | 0.62 |
| **Very satisfied, n (%)** | 40 (87) | 70 (86) | 9 (90) | |
| **Very dissatisfied, n (%)** | 0 | 1 (1) | 0 | |
| **Improvement in Quality of Life post-THA** | | | | 0.68 |
| **Great improvement, n (%)** | 42 (53.1) | 42 (51.2) | 6 (60) | |

## Table 2

### Pregnancy variables

| | Pre-THA Pregnancy (N=82) | Post-THA Pregnancy (N=10) | P-Value |
|---|---|---|---|
| **Age at pregnancy, years (SD)** | 33.3 (5.7) | 39.9 (5.0) | 0.01 |
| **Weight gain, lbs (SD)** | 35.1 (19.2) | 30.1 (13.6) | 0.48 |
| **Uncomplicated delivery, n (%)** | 62 (78) | 9 (90) | 0.46 |
| **Vaginal delivery, n (%)** | 52 (64) | 7 (70) | 0.74 |
| **Elective Cesarean, n (%)** | 20 (25) | 3 (30) | 0.74 |
| **Unanticipated Cesarean, n (%)** | 7 (9) | 0 | 0.74 |
| **Singletons** | 77 (95) | 9 (90) | 0.51 |
| **Twins** | 4 (5) | 1 (10) | 0.51 |
| **Weight of baby, lbs (SD)** | 7.5 (1.5) | 7.3 (0.6) | 0.8 |
| **Back pain during pregnancy, n (%)** | 36 (45) | 5 (56) | 0.55 |
| **Groin pain during pregnancy, n (%)** | 17 (22) | 1 (11) | 0.46 |
| **Knee pain during pregnancy, n (%)** | 11 (14) | 2 (22) | 0.52 |
| **Parity at time of survey response** | | | 0.34 |
| **1, n (%)** | 29 (35) | 5 (50) | |
| **2, n (%)** | 31 (38) | 4 (40) | |
| **3, n (%)** | 19 (23) | 0 | |
| **>3, n (%)** | 3 (4) | 1 (10) | |
| **Time between delivery and THA, mth (SD)** | 85.3 (66.1) | 25.6 (7.9) | |