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Original article

Postpartum complications in new mothers with juvenile idiopathic arthritis: a population-based cohort study

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Abstract

Objective. The aim was to evaluate the prevalence of postpartum complications, including depression, in new mothers who had juvenile idiopathic arthritis (JIA) and to assess whether these differ from mothers who never had JIA.

Methods. Our cohort study used data from physician billing and hospitalizations covering Quebec, Canada. We identified females with JIA with a first-time birth between 1 January 1983 and 31 December 2010 and assembled a control cohort of first-time mothers without JIA from the same administrative data, matching 4:1 for date of first birth, maternal age and area of residence. We compared the following postpartum complications: major puerperal infection, anaesthetic complications, postpartum haemorrhage, thromboembolism, obstetrical trauma, complications of obstetrical surgical wounds and maternal depression in the first year after delivery, in the JIA *vs* non-JIA groups, using bivariate analysis and multiple logistic regression.

Results. The mean age at delivery was 24.7 years in the JIA group (n = 1681) and 25.0 years for the non-JIA group (n = 6724). Mothers with JIA were more likely to experience complications attributable to anaesthetic [adjusted risk ratio (aRR) 2.17, 95% CI; 1.05, 4.48], postpartum haemorrhage (aRR = 2.75, 95% CI: 2.42, 3.11) and thromboembolism (aRR = 5.27, 95% CI: 1.83, 15.17) but were at lower risk for obstetrical trauma (aRR = 0.78, 95% CI: 0.64, 0.95) or newly to develop depression in the first year postpartum (aRR = 0.52, 95% CI: 0.40, 0.68).

Conclusion. Mothers with JIA appear to be at higher risk for complications attributable to anaesthesia, postpartum haemorrhage and thromboembolism. Prevention strategies for postpartum haemorrhage and thromboembolism may be especially important in this population.

Key words: juvenile arthritis, pregnancy, postpartum haemorrhage, postpartum depression, cohort study, postpartum complications, postpartum thromboembolism, administrative data, obstetrical complications, risk

CLINICAL SCIENCE

Rheumatology key messages

- Mothers with JIA are at risk for complications from anaesthesia, postpartum hemorrhage and thromboembolism.
- Prevention for postpartum haemorrhage and thromboembolism may be important for mothers with JIA.
- There was no increase in postpartum depression among mothers with JIA.

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Introduction

Studies on pregnancy and birth outcomes in women with rheumatological conditions, including juvenile idiopathic arthritis (JIA), have focused for the most part on pregnancy outcomes (e.g. gestational hypertension and diabetes) and birth outcomes (e.g. congenital malformations, small for gestational age, prematurity). Reports confirm increased prevalence of prematurity, small for gestational age, congenital malformations and maternal hypertension in women with inflammatory arthritis, including JIA [1–5]. There is little information regarding maternal postpartum complications in women with inflammatory arthritis conditions and only one on persons with JIA. In that study, Chen *et al.* [6] reported higher rates of postpartum haemorrhage and severe maternal morbidity among mothers with a history of JIA compared with the general population.

Gayed and Gordon [7] reviewed pregnancy and the rheumatic diseases, noting that postpartum flare was common in all rheumatic diseases (although JIA was not included in this review). A few studies addressed postpartum outcomes in women with specific inflammatory arthritic conditions. Women with lupus appear to be at risk for postpartum haemorrhage as well as for thromboembolic events [8]. In AS, there was no increase in complications attributable to epidural analgesia, but these women were much more likely to undergo Caesarean section than controls [9]. In a study of 49 women in Sweden (10 with RA and 10 with AS and 29 age-matched healthy controls) [10], none of the women in this small sample developed postpartum depression within 24 weeks post-delivery. In contrast, women with all types of disabilities had a greater likelihood of developing postpartum depression in comparison with those without a disability [11]. Factors associated with postpartum depression include adverse birth outcome (prematurity, low birth weight, infant illness/disability), diabetes [12], younger maternal age [13], having a previous history of depression and experiencing stressful life events during pregnancy and, to a lesser extent, low socio-economic status [14].

The association between Caesarean section and postpartum depression is unclear, with conflicting results [15, 16]. However, Caesarean delivery is associated with a higher incidence of major puerperal infection, thromboembolic events, anaesthetic complications and obstetrical surgical wound complications [17]. Also, having a baby with high birth weight (macrosomia) may be associated with obstetrical trauma and other adverse outcomes [18, 19]. Other factors that may be associated with complications include hypertension and heart disease, eclampsia, maternal demographics and access/use of prenatal care [20–22].

Our objective was to evaluate the prevalence of postpartum complications in first-time mothers with JIA in comparison with first-time mothers who never had JIA. Specifically, we looked at major puerperal infection, anaesthetic complications, postpartum haemorrhage, thromboembolism, obstetrical trauma, complications of obstetrical surgical wounds and depression in the first year after delivery. A secondary (more exploratory) objective was to assess whether women with ongoing disease were more likely to experience postpartum complications. In order to do so, we compared mothers with JIA who had seen a rheumatologist in the year before delivery with those with JIA who had not seen a rheumatologist.

Methods

Population

We conducted a retrospective cohort study, identifying all women with JIA who gave birth for the first time between 1 January 1983 and 31 December 2010. The data were obtained from three linked administrative databases that cover the entire population of residents of the province of Quebec, Canada. These databases were: the physician billing database, which records information on physician visits, diagnosis and procedures; the hospitalization discharge database, which records hospitalization data, including gestational age; and the demographic events database, which provides demographic information on the mother and father as well as the birth weight for live births and stillbirths. We considered women to have juvenile arthritis if they had at least three physician visits with the International Classification of Diseases (ICD) 9 code 714 and ICD10 codes M08, M09 between 1 January 1983 and 31 December 2010 and were 16 years of age or younger at the time of the first JIA diagnosis. We followed them until 31 December 2010 in order to identify those who gave birth for the first time (stillbirth or live birth). We compiled a comparison cohort of women who had no physician visits with the ICD9 or 10 codes listed above, matching four first-time mothers without JIA for each woman with juvenile arthritis who gave birth, on date of delivery (±3 months), age (±5 years) and region of residence (using the first three digits of the six-digit postal code).

The outcomes of interest for this study were the following postpartum complications: major puerperal infection (ICD9 670, 673.3; ICD10 O8689, O8832), anaesthetic complications (ICD9 668; ICD10 O741, O8909, O742, O891, O743, O748, O749, O898, O899), postpartum haemorrhage (ICD9 666 and procedural codes 99.03–99.09; ICD10 O720, O721, O722, O723 and procedural codes 30233, 30243, 30253, 30263), thromboembolism (ICD9 451, 452, 453, 671.3, 671.4, 671.5; 415.1, 673.2, 673.8 or ICD10 I80, I81, I822, I823, O225, O228, O871, O873; I269, O882, O888), obstetrical trauma (ICD9 665.3, 665.4, 665.5, 665.6, 665.8, 665.9; ICD10 O713, O714, O715, O716, O717, O7189, O719), complications of obstetrical surgical wounds (ICD9 674.3; ICD10 O860, O902) and postpartum depression in the first year following delivery (ICD9 684.4, 296, 300, 309, 311; ICD10 O90.6, O99.34, O99.345, F53, F32.9, F30–33, F34.1, F41.9, F43.2). The codes for complications except for thromboembolism and maternal depression were adapted from a previous study [17]. Thromboembolism codes used in this study were the ones described by Liu *et al.* [23] in a study on the general Canadian population and included deep vein thrombosis and pulmonary embolism.

For maternal depression, we included the specific codes for depression in the immediate postpartum period and also adapted the definitions by Brownell *et al.* [24] and Yang *et al.* [16] for depression within the year after childbirth.

Analysis

The analysis consisted of comparisons for each of the outcomes, by exposure status (having juvenile arthritis or not), using bivariate χ^2 analysis and multiple logistic regression. For each of the logistic regression models, we adjusted for covariates. These included Caesarean section, socio-economic status (using the proxy variable of maternal education), hypertension, diabetes, adverse birth outcome (at least one of the following: stillbirth, prematurity, small for gestational age or congenital malformation) and giving birth to a baby with macrosomia, defined as having a birth weight $\geqslant$4000 g [25]. For thromboembolism, we adjusted for age, Caesarean section and pre-eclampsia [26]. For maternal depression, we calculated two models: having a new diagnosis of depression (i.e. no diagnosis within 2 years before delivery); and any diagnosis of depression after delivery, with adjustment for depression in the 2 years before delivery in addition to the other covariates.

For our secondary objective, we identified mothers with JIA who had seen a rheumatologist within 1 year before delivery. The rationale was that women who were being followed by a rheumatologist would be more likely to have symptoms or problems related to their arthritis that required treatment and follow-up. We compared the outcomes between mothers with JIA who had seen a rheumatologist within 12 months of delivery with those with JIA who had not visited a rheumatologist within that time period, using bivariate comparisons, and if the numbers were large enough, we also conducted multiple logistic regression, adjusting for the same covariates used in the primary analysis.

We received ethics approval from the Quebec commission for access to information as well as the CERÈS, The Health Research Ethics Committee at the Université de Montréal.

Results

Our cohort consisted of 8405 women who experienced a first birth: 1681 women with JIA and 6724 women who never had JIA. For the entire cohort, the mean (S.D.) age at delivery was 24.9 (4.4) years and the age range at delivery was 16–46 years. There was a higher proportion of hypertension and heart disease among the JIA group (8.5%, 95% CI: 7.3, 9.9) than the non-JIA group (4.6%, 95% CI: 4.2, 5.2), and there were more adverse neonatal outcomes in the JIA group (28.8%, 95% CI: 26.6, 31.0) *vs* the non-JIA group (18.9%, 95% CI: 18.0, 19.8). The rates of Caesarean section were similar for both groups. Descriptive characteristics of the JIA (n = 1681) and non-JIA groups (6724) are listed in Table 1.

The outcomes in the JIA and non-JIA groups are reported in Table 2. Women with JIA were more likely to have complications attributable to anaesthetic, postpartum haemorrhage and thromboembolism but less likely to have complications of obstetrical surgical wounds and depression in the first year after delivery (Table 2).

The results of the logistic regression models for each outcome are described in Table 3. Logistic regression confirmed that mothers with JIA were more likely to experience complications attributable to anaesthetic [adjusted risk ratio (aRR) = 2.17, 95% CI: 1.05, 4.48] or postpartum haemorrhage (aRR = 2.75, 95% CI: 2.42, 3.11) but were at lower risk for obstetrical trauma (aRR = 0.78, 95% CI: 0.64, 0.95), postpartum depression in the first year (aRR = 0.49, 95% CI: 0.39, 0.63) or newly to develop depression in the first year postpartum (aRR = 0.52, 95% CI: 0.40, 0.68). Owing to small numbers for thromboembolism, we calculated separate models that included JIA and one other covariate (adjusting for pre-eclampsia, Caesarean section or age). Results of these bivariate logistic regression models indicated aRRs for JIA of 5.27 (95% CI: 1.83, 15.17) adjusting for pre-eclampsia, 5.29 (95% CI: 1.84, 15.21) adjusting for Caesarean section and 5.36 (95% CI: 1.63, 15.43) adjusting for age. Caesarean section was associated with a lower risk for haemorrhage or obstetrical trauma, and macrosomia was associated with a higher risk of haemorrhage. Having a history of depression was strongly associated with development of depression in the 12 months postpartum (aRR = 3.56, 95% CI: 2.99, 4.23).

Among the 1681 mothers with JIA, 107 (6.4%) saw a rheumatologist within 12 months of giving birth, possibly indicative of ongoing disease or treatment for JIA. Those who saw a rheumatologist within a year of giving birth were older than those who had not seen a rheumatologist [mean (S.D.) age 26.2 (4.9) *vs* 24.6 (4.2) years, $P < 0.01$], more likely to have hypertension or heart disease (14.9 *vs* 8.1%, P = 0.01) and to deliver via Caesarean section (15.9 *vs* 8.1%, P = 0.01). We found a higher proportion of anaesthetic complications, postpartum haemorrhage and thromboembolism among mothers with JIA who had seen a rheumatologist in the 12 months before delivery *vs* those who did not see a rheumatologist (Table 4).

In multivariate analysis, adjusting for covariates, mothers with JIA who had seen a rheumatologist within 12 months of delivery were more likely to experience postpartum haemorrhage (aRR = 1.99, 95% CI: 1.53, 2.60) compared with mothers with JIA who had not seen a rheumatologist within 12 months of delivery. We were unable to perform multivariate analysis for anaesthetic complications and thromboembolism because of the smaller number of events for these outcomes.

Discussion

Women with JIA were at higher risk for several postpartum complications, including anaesthetic complications, postpartum haemorrhage and thromboembolism. Risks for these outcomes were higher for women who had visited their rheumatologist in the 12 months before giving birth. Mothers with JIA were at lower risk for obstetrical trauma

Table 1 Characteristics of the cohort (n = 8405)

	Exposed (JIA) (n = 1681)	Non-exposed (non-JIA) (n = 6724)	P-value
Age at delivery, years			0.04
Mean (S.D.)	24.7 (4.3)	25.0 (4.5)	
Median (range)	24.0 (16.0–40.0)	25.0 (16.0–46.0)	
Length of stay, days			0.70
Mean (S.D.)	3.2 (1.8)	3.2 (2.2)	
Median (range)	3.0 (0.0–30.0)	3.0 (0.0–74.0)	
Female baby, n (%)	849 (50.5)	3207 (47.7)	0.04
Lower level of education,[a] n (%)	873 (51.9)	3424 (50.9)	0.46
Hypertension/heart disease,[b] n (%)	143 (8.5)	311 (4.6)	<0.001
Diabetes,[b] n (%)	15 (0.9)	38 (0.6)	0.13
Caesarean section, n (%)	144 (8.6)	561 (8.4)	0.77
Macrosomia, n (%)	99 (5.9)	383 (5.7)	0.66
Adverse neonatal outcome, n (%)	485 (28.8)	1269 (18.9)	<0.001

[a]Less than 14 years. [b]Before or during pregnancy.

Table 2 Postpartum complications in the JIA and non-JIA groups

Complication	JIA, % (95% CI) (n = 1681)	Non-JIA, % (95% CI) (n = 6724)	P-value
Major puerperal infection	3.15 (2.32, 3.99)	2.99 (2.58, 3.40)	0.73
Thromboembolic events	0.48 (0.15, 0.80)	0.09 (0.02, 0.16)	0.001
Anaesthetic complications	0.65 (0.27, 1.04)	0.33 (0.19, 0.46)	0.05
Postpartum haemorrhage	21.06 (19.11, 23.01)	7.66 (7.02, 8.29)	<0.001
Obstetrical trauma	6.72 (5.53, 7.92)	8.69 (8.01, 9.36)	0.01
Complications of obstetrical surgical wounds	1.49 (0.91, 2.07)	1.55 (1.25, 1.84)	0.86
Depression in the first year after delivery	4.16 (3.21, 5.12)	8.25 (7.60, 8.91)	<0.0001
New depression in first year after delivery[a]	3.45 (2.58, 4.32)	6.50 (5.91, 7.09)	<0.0001

[a]No depression in the 2 years before delivery.

and for developing depression in the period 1 year postpartum compared with mothers without JIA.

Anaesthetic complications in our study include pulmonary, cardiac, nervous system and other complications related to administration of anaesthetic or sedation in labour or delivery. There was a higher proportion of mothers with JIA (0.65%) than non-JIA mothers (0.33%) who had these complications. In a population-based study in California, the proportion of mothers with these complications was 0.31% [27], which is only slightly lower than the proportion for our entire sample, which was 0.39%.

Our results on postpartum haemorrhage among women with JIA (21.06%) are slightly higher than those reported by Chen *et al.* [6] (18%); our aRR of 2.75 is similar to their adjusted odds ratio of 2.45. Mothers with lupus were also more likely to have postpartum haemorrhage compared with mothers who did not have lupus, and the adjusted odds ratio of 2.7 (95% CI: 1.8, 4.0) was almost identical to what we found [8]. The rate of postpartum haemorrhage in our non-JIA group (7.6%) was slightly higher than that reported by Roberts *et al.* [28] in New South Wales, Australia (6.8%), and in Canada excluding Quebec (6.1%) [29]. Possible mechanisms may be related to use of NSAIDs during pregnancy, which can be linked to excessive bleeding [30].

Incidence of pregnancy-related thromboembolism (deep vein thrombosis and pulmonary embolism) in Canada were reported as 12.1 and 5.4/10 000 births, respectively [23]. In our study, the rates for deep vein thrombosis and pulmonary embolism were comparable at 13 and 4/10 000. Although there were few thromboembolic events, mothers with JIA were much more likely to suffer these outcomes compared with mothers who did not have JIA. Mothers with lupus have an increased risk for thromboembolism, but that study included events during pregnancy as well as in the postpartum period [20]. Two recent studies, one in the UK and one in Taiwan, found that persons (mean age of 58 and 52 years, respectively) with a diagnosis of RA were at a 2- to 3-fold increased risk for deep vein thrombosis or pulmonary embolism, although there is no information

TABLE 3 Factors associated with postpartum complications: adjusted risk ratio (95% CIs)

Factor	Major puerperal infection	Thromboembolic event	Anaesthetic complication	Postpartum haemorrhage	Obstetrical trauma	Obstetrical surgical wound complication	Depression in the first year postpartum	New case of depression postpartum
JIA	1.07 (0.79, 1.44)	**5.29 (1.84, 15.21)**	**2.17 (1.05, 4.48)**	**2.75 (2.42, 3.11)**	**0.78 (0.64, 0.95)**	0.97 (0.63, 1.50)	**0.49 (0.39, 0.63)**	**0.52 (0.40, 0.68)**
Age ⩾25 years	**1.36 (1.03, 1.78)**	–	1.21 (0.56, 2.61)	0.94 (0.82, 1.08)	**0.78 (0.67, 0.91)**	1.12 (0.76, 1.64)	0.93 (0.79, 1.10)	0.83 (0.69, 1.00)
Education ⩾14 years	0.96 (0.73, 1.24)	–	1.13 (0.53, 2.38)	**1.14 (1.00, 1.30)**	0.97 (0.83, 1.14)	0.79 (0.54, 1.16)	0.97 (0.82, 1.14)	0.89 (0.74, 1.08)
Caesarean section	**1.57 (1.10, 2.23)**	**5.99 (2.02, 17.79)**	1.82 (0.70, 4.74)	**0.72 (0.55, 0.93)**	**0.10 (0.04, 0.22)**	**2.02 (1.24, 3.28)**	1.07 (0.83, 1.39)	1.17 (0.87, 1.57)
Hypertension or diabetes	0.88 (0.51, 1.49)	–	0.46 (0.06, 3.37)	0.98 (0.77, 1.25)	0.91 (0.66, 1.26)	1.01 (0.50, 2.07)	1.04 (0.77, 1.42)	1.18 (0.84, 1.66)
Adverse neonatal outcome	0.88 (0.64, 1.21)	–	0.49 (0.17, 1.42)	0.95 (0.81, 1.10)	0.92 (0.77, 1.10)	1.17 (0.77, 1.77)	1.16 (0.97, 1.39)	1.12 (0.91, 1.38)
Macrosomia	**1.68 (1.13, 2.52)**	–	0.87 (0.21, 3.67)	**1.31 (1.04, 1.64)**	0.92 (0.66, 1.28)	0.50 (0.19, 1.36)	–	–
Depression 2 years pre-delivery	–	–	–	–	–	–	**3.56 (2.99, 4.23)**	–

Values in bold are statistically significant (the relative risks exclude 1).

regarding the effect of pregnancy and childbirth [31, 32]. Possible mechanisms include the influence of inflammation on blood coagulation and also endothelial dysfunction [33, 34].

There was less obstetrical trauma among the JIA group (6.7%) *vs* the non-JIA group (8.7%). The proportion of obstetrical trauma is higher than the 6.1% found in the general Ohio population 1991–96 [17]. Factors associated with obstetrical trauma include speed at which the head is delivered, fetal size, use of forceps or vacuum extraction and episiotomy [35]. We did not have information on many of these factors that could potentially explain this finding.

Interestingly, we found that women with JIA are at considerably lower risk for developing postpartum depression. There may be under-reporting of this diagnosis in administrative databases; the prevalence in our cohort was 5.9%, whereas Canadian studies that used the Edinburgh Postnatal Depression Scale to assess postpartum depression indicate higher frequencies between 7.5 and 8.7% [36, 37]. Although not addressing postpartum depression, Packham *et al.* [38] reported lower depression among their cohort of adults with JIA (mean age 35.4 years) compared with the general population. In other rheumatic diseases, there have been no reports of increased postpartum depression either, although there is evidence of increased depression in persons with inflammatory arthritis [39, 40]. In fact, findings from a study on 20 pregnant patients (10 with RA and 10 with AS) indicated that mental health scores on the SF-36 remained stable throughout pregnancy and up to 24 weeks postpartum, even among those with postpartum disease flares [10]. This finding was confirmed in women with RA and JIA in a Norwegian study [41].

Our results may also imply that women with ongoing disease (defined in our study as those who saw a rheumatologist in the year before giving birth) may be at higher risk for anaesthetic complications and postpartum haemorrhage. It is possible that ongoing inflammation might increase the risk for these outcomes.

There are several limitations to this retrospective administrative data-based study. Although we are confident of the validity of our diagnosis, it is based on administrative physician visits for a diagnosis of inflammatory arthritis. We have previously used a similar algorithm, and mean age at diagnosis and sex distribution statistics were similar to those reported for JIA in general, which may support the validity of our approach to case definition [42, 43]. In this study, we were even stricter in our definition of a case by including only those who had at least three coded visits (as opposed to at least two coded visits) as cases. Validity of JIA diagnosis improves with subsequent arthritis codes [44]. Also, our outcomes are based on diagnostic and procedural codes from the administrative databases. Errors in diagnosis are likely to be non-differential between those with JIA and those with no JIA. Furthermore, our results (e.g. postpartum haemorrhage, anaesthetic complications, thromboembolism) are similar to those reported in other studies and jurisdictions [6, 23, 27, 28].

TABLE 4 Postpartum complications in mothers with and without rheumatologist visit within 12 months of giving birth

Complication	Rheumatology visit, RR (95% CI) (n = 107)	No rheumatology visit, RR (95% CI) (n = 1574)	P-value
Major puerperal infection	1.87 (0.00, 4.44)	3.24 (2.37, 4.11)	0.43
Thromboembolic events	1.87 (0.00, 4.44)	0.38 (0.08, 0.69)	0.031
Anaesthetic complications	5.61 (1.25, 9.97)	0.32 (0.04, 0.60)	<0.0001
Postpartum haemorrhage	39.25 (30.00, 48.50)	19.82 (17.85, 21.79)	<0.0001
Obstetrical trauma	4.67 (0.67, 8.67)	6.86 (5.61, 8.11)	0.38
Complications of obstetrical surgical wounds	0	1.59 (0.97, 2.21)	0.19
Depression in first year post-delivery	3.74 (0.14, 7.33)	4.19 (3.20, 5.18)	0.82
New depression in first year post- delivery[a]	3.74 (0.14, 7.33)	3.43 (2.53, 4.33)	0.87

[a]No depression in the 2 years before delivery. RR: risk ratio.

As is the case with retrospective studies, we did not have information on some variables that are not available in the administrative databases, notably obesity, physical activity or inactivity and lifestyle factors, such as diet and smoking. However, we controlled for maternal education, which is associated with lifestyle [45]. Furthermore, persons with JIA may be less likely to smoke [46]. Also, although our study includes the largest sample size to date on JIA and pregnancy outcomes, the numbers for some of the adverse outcomes were small (e.g. thromboembolic events, anaesthetic complications).

Finally, we did not have information on medications, which may be associated with several outcomes. Also, we have no indication of the clinical severity of JIA. In an attempt to explore the aspect of women having ongoing problems attributable to their disease, we compared those women who had visited a rheumatologist in the 12 months before delivery with those who did not, finding a higher rate of adverse outcomes among those who presumably had ongoing problems attributable to their arthritis.

Our findings may have clinical implications for prevention. The risk for anaesthetic complications is small, but nevertheless, being aware of the fact that women with JIA are at increased risk for anaesthetic complications may be important for anaesthetists and obstetricians. For prevention of postpartum haemorrhage, the current recommendation by the World Health Organization is that women should be offered uterotonics (e.g. oxytocin 10 IU i.m. or i.v.) during the third stage of labour and also, possibly, controlled cord traction [47]. General recommendations for reducing the risk of thromboembolism are to encourage early mobilization and prevent dehydration [48]. Pharmacological prophylaxis recommendations are based for the most part on expert consensus and relate to women who have known risk factors (e.g. known circulatory disease, APS, inflammatory conditions; although JIA is not specified) or those who are undergoing surgery, including Caesarean section. The preventive strategies for postpartum haemorrhage and for thromboembolism may be especially important for women with JIA, and there are implications for research regarding specific parameters in women with inflammatory conditions.

Conclusion

Mothers with JIA appear to be at higher risk for complications from anaesthesia, postpartum haemorrhage and thromboembolism. Prevention strategies, especially for postpartum haemorrhage and also for thromboembolism, may be important for women with JIA who are giving birth. Physicians need to be aware of the higher risk for these adverse events in the postpartum period among mothers with JIA.

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