

Steroid Exposure Postpartum

Patricia Zheng, MD¹; Ryan D'Souza, MD²; David C. Miller, MD, MA³; Aditya Raghunandan, MD⁴; and Jaymin Patel, MD⁵ on behalf of the Spine Intervention Society's Patient Safety Committee

¹University of California, San Francisco, Dept of Orthopaedic Surgery, San Francisco, California, USA;

²Mayo Clinic, Dept of Anesthesiology and Perioperative Medicine, Rochester, Minnesota, USA;

³Q C Kinetix, Denver, Colorado, USA;

⁴UT Health San Antonio, San Antonio, Texas, USA;

⁵Emory University, Department of Orthopaedics, Atlanta, Georgia, USA

Myth: Steroid administration via spinal injections is contraindicated in postpartum patients, especially if breastfeeding.

Fact: There is no absolute contraindication to steroid injections based on postpartum or lactating status, but there may be disruption of both maternal and breastfed child hypothalamic-pituitary-adrenal (HPA) axis response to steroid administration. For the duration of breastfeeding, milk production may be affected after steroid exposure, and withholding breast milk produced for several hours after exposure minimizes infant exposure.

The postpartum period is defined as the period between delivery of the conceptus to when maternal physiology returns to a nonpregnant state [1]. The duration of this period is debatable and ranges from 24 hours (considered the acute phase) up to months after delivery or until lactation stops [2]. In the postpartum period, there are maternal physiological changes, including changes in hormonal regulation both separate from and related to lactation [1]. Studies have suggested that women may be particularly susceptible to back pain in this period, with a point prevalence of 67% [3], possibly as a result of pregnancy-related weight changes, alteration of posture, as well as physical demands related to childrearing [3,4]. Consequently, postpartum women may be regarded as candidates for interventional procedures which may incorporate glucocorticoid therapeutic agents given their higher incidence of back pain compared to the general population in a similar age range. This may raise safety concerns about steroid exposure in postpartum women as steroids may disrupt the already altered HPA axis, affect breast milk production, and be secreted in the breast milk from lactating individuals after steroid exposure with ensuing potential adverse effects on the newborn [5].

Changes in Maternal Response to Steroid Administration in the Postpartum Period

Systemic side effects of steroid exposure include transient hyperglycemia, hypertension, fluid retention, altered hematopoietic response, psychiatric effects, and Cushing's Syndrome [6] as previously summarized by published FactFinders on the effects of steroid exposure during spine injections [7,8]. Except for hyperglycemia, which originates from directly reducing the action of insulin and increasing the hepatic release of glucose, many of these side effects stem from changes in the HPA axis [9]. In the postpartum period, the HPA axis undergoes dramatic changes, which may impact the side effects profile experienced by exogenous glucocorticoid administration when compared to non-postpartum patients after steroid injections [10]. In pregnancy, there is an increase in serum cortisol levels partly due to estrogen stimulation of the corticosteroid-binding globulin with a rise in bioavailable cortisol levels [10]. In the postpartum

period, maternal plasma cortisol levels eventually fall, and the HPA axis returns to its nonpregnant state [11]. Suppression of corticotropin-releasing hormone following pregnancy is evident at 3 weeks and 6 weeks and normalizes by 12 weeks [12]. Lactating women may demonstrate longer disturbances as other studies have shown that prolactin, typically elevated during lactation, may blunt HPA responses to stress [13]. Overall, data are lacking, but postpartum women may have altered systemic physiologic responses to exogenous steroids. Some of this response is mediated by altered relative estrogen vs. prolactin levels [14], which may result in an amplified systemic side effect profile that differs from non-pregnant individuals.

Steroid Secretion in Breast Milk After Exogenous Administration

The American College of Obstetricians and Gynecologists Committee Opinion categorized glucocorticoids as low-risk in terms of teratogenicity and states they are “compatible” with breastfeeding [15]. A summary from the British Society of Rheumatology and others classify corticosteroids as “compatible with pregnancy and breastfeeding [16].” However, as steroids can be transmitted in breast milk [17], historically, some have advised withholding breast milk produced from lactating women who receive spinal steroid injections [18]. The best-studied steroid in lactating patients is intravenous methylprednisolone [19]. The quantity of methylprednisolone secreted in breast milk is very low, and no adverse reactions in breastfed infants have been reported in the literature [19]. A study of lactating individuals with multiple sclerosis was conducted in which individuals received 1 gram of methylprednisolone intravenously. Breast milk samples were taken 1, 2, 4, 8, and 12 hours after exposure. Levels of methylprednisolone in breast milk peaked at 1 hour after infusion and averaged 1.24 mg/L before leveling off to 0.04 mg/L by 8 hours and 0.01 mg/L at 12 hours [20,21]. By comparison, normal breast milk cortisol is less than 0.02 mg/L [18]. The authors of this study recommended interrupting lactation or a “pump-and-dump” strategy within 4 hours of infusion [21], although other groups have advised a shorter interruption of only 2 hours. Note that the systemic effects of locally injected corticosteroids are dose-related [22] and 1 gram of methylprednisolone was administered intravenously, which would likely yield more systemic effects than a localized epidural or joint injection, and 1 gram is about 25 times the dose of an epidural steroid injection. Studies on peak serum concentration after steroid injections in the spine are lacking, but one study suggested that peak serum concentration of triamcinolone following intra-articular facet joint injections occurred within 24 hours with a serum triamcinolone level of 3.6 ng/mL [23]. Such detailed analyses of breast milk secretion after steroid exposure have not been performed for other steroids such as betamethasone [24], triamcinolone [25], and dexamethasone [26]. It is unclear whether it is necessary to withhold breast milk produced from lactating women who receive spinal steroid injections.

Effects of Maternal Steroid Administration on Lactation

Endogenous steroids are involved in breast milk initiation and maintenance of production. Animal studies have shown that exogenous glucocorticoid steroid administration can diminish milk production and ejection [27]. In case reports, a lactating woman who was 6 weeks postpartum and primarily breastfeeding received an injection of 24 mg of methylprednisolone for De Quervain’s tenosynovitis and experienced a temporary cessation of breast milk production. Production resumed spontaneously 36 hours later and normalized 90 hours after the injection [27]. In another case report, a high-dose injection of 80-120 mg triamcinolone injected into cervical and thoracic regions epidurally resulted in significant breast milk reduction in a patient who had established lactation [28]. Interestingly, in this same woman, a prior lower dose (5.7 mg) betamethasone injection into the shoulder for bursitis did not affect milk production [28]. Whether the difference is secondary to the dose or somehow a cumulative effect is unknown.

Effects in Breastfed Infants

The Drugs and Lactation Database (LactMed) provided by the National Institute of Health currently reports that for methylprednisolone: “amounts of methylprednisolone [secreted] in breast milk are very low, and no adverse reactions in breastfed infants have been reported” [17]. However, it should be acknowledged that there are minimal published data about the effects on breastfed infants from maternal steroid exposure to methylprednisolone or other exogenous corticosteroid administration. A prior retrospective analysis demonstrated a reduction in infant weight, length, and head circumference with increased human milk glucocorticoid levels, mostly as a result of betamethasone administration as two 12-mg intramuscular injections 24 hours apart to the mother [29]. This study reported preliminary evidence that supports a possible association between glucocorticoid levels in ingested milk and infant adiposity and head circumference during the first year of life. However, several case reports and series on maternal systemic steroid exposure (oral or intravenous) demonstrated no changes in these measures in breastfed infants. First, in a population of 16 postpartum females with multiple sclerosis who received intravenous steroids and did not breastfeed for 4 hours after a systemic steroid dose,

no adverse effects were observed in infants between 3-12 months follow-up [30]. Second, in a study of infants breastfed by mothers receiving methylprednisolone intravenously after only withholding milk 2 hours after infusion, the infants displayed no adverse effects up to 24 months with normal weight, height, and developmental milestones [20]. Finally, in a single case of a mother with rheumatoid arthritis treated with oral methylprednisolone daily plus intermittent

corticosteroid injections while breastfeeding her infant, there was normal growth, psychomotor development, and laboratory data in the baby at 9 months of age [31]. These case reports and series highlight the possible safety of maternal systemic steroids on the breastfeeding neonate, but additional high-quality, well-powered, and long-term studies are warranted to confirm the accuracy of their conclusions.

Conclusion

In the immediate and postpartum periods, there are significant changes to the HPA axis. Spinal corticosteroid injection during the postpartum period may be a factor that results in three potential adverse effects: prolongation of maternal HPA axis suppression, interference with infant growth and development, and disruption of lactation.

Recommendations

- Inform women in the postpartum and lactating period of the possible additional adverse effects of systemically absorbed corticosteroid.
- Systemic effects of locally injected corticosteroids are dose-related, and use of the lowest effective dose is recommended in all patients, including postpartum patients.
- For lactating patients, discuss the potential risks of corticosteroid administration for the breastfed infant, possibly associated with disrupted infant growth and development. A 'pump and dump' strategy may be considered after injectable corticosteroid administration, but direct evidence is lacking to support this practice.
- Inform lactating patients that steroid exposure has been associated with temporary effects on milk production in certain individuals. It is unknown how frequently this occurs.

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