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Double Duty: Does Epidural Labor Analgesia Reduce Both Pain and Postpartum Depression?

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Nearly one-third of pregnant women in the United States undergo cesarean delivery.¹ Effective analgesia is crucial to maximize the mother's comfort, increase her mobility, and support lactation and emotional attachment to her newborn. The incidence of severe acute postpartum pain is approximately 11%.² Chronic pain incidence varies by study and ranges from 1% to 4% to 10% after vaginal delivery and 6% to 18% after cesarean delivery.^{3,4} Chronic pain frequently co-occurs with depression. Eisenach et al.² evaluated whether mode of delivery or acute postpartum pain was associated with persistent pain and depression 8 weeks after childbirth in a multicenter, prospective, longitudinal cohort study ($n = 1288$). The prevalence of severe acute pain within 36 hours of birth was 10.9%. Women with severe acute pain had a 2.5-fold increased risk of persistent pain and a 3-fold increased risk for postpartum depression compared with those with mild postpartum pain.

The sparse data available suggest that managing intrapartum and early postpartum pain decreases the risk for depression. Hiltunen et al.⁵ showed that the risk of postpartum depression was significantly reduced in women who received epidural/paracervical analgesia compared to women with no analgesia (odds ratio [OR] = 0.25, 95% confidence interval [CI], 0.09–0.72). In a nationally representative sample of Canadian mothers ($n = 5614$), Gaudet et al.⁵ used survey data to evaluate the prevalence and duration of

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problematic perinatal pain, defined as pain located in the vagina, cesarean incision site, breasts, back, or severe headaches. The interviews were conducted at a mean of 7.3 months (range 5–14) postpartum. The odds of screening positive for postpartum depression for women reporting prolonged perinatal pain compared to those without pain in the first 3 months equaled 1.7 (95% CI, 1.2–2.5). The odds of a positive screen for depression in women reporting perinatal pain at the time of the interview was 2.4 (95% CI, 1.6–3.6); 27% of mothers continued to have problematic perinatal pain. An interesting finding was a dose–response association between the number of types of perinatal pain at the time of interview and postpartum depression. In addition to the pain variables, the independent predictors of postpartum depression were perceived stress, number of past stressful life events, lack of social support, history of depression, childhood maltreatment, and maternal nativity status.

Both biological and psychosocial factors contribute to postpartum depression. New episodes of depression occur in 14.5% of women in the first 3 months after birth, and the 1-year period prevalence is a striking 21.9% (95% CI, 15.1%–30.0%).⁷ Women with postpartum onset depression are exquisitely sensitive to the massive gonadal steroid withdrawal that occurs at birth. This biological vulnerability interacts with predelivery risk factors for major depressive disorder (MDD).⁸ In a model of the occurrence of MDD over a 1-year period with data from nearly 2,000 female twins, 52% of the variance of MDD was explained by 3 factors⁹: internalizing (early life onset of anxiety disorders), externalizing (conduct problems, substance abuse), and adversity (childhood maltreatment and interpersonal problems). Adverse early life experiences, such as physical and/or sexual abuse, sensitize the central nervous system circuits involved in the regulation of stress and emotion and increase vulnerability to subsequent stress.¹⁰ In a prospective, population-based study, childhood history of physical abuse was strongly associated with depression alone (OR = 3.35, 95% CI, 1.98–5.68) and depression with chronic pain and physical conditions (OR = 4.36, 95% CI, 1.74–10.97).¹¹ Despite the well-established association between depression and pain, surprisingly few studies of postpartum depression have included assessments of pain during labor or in the postpartum period.

Because the postpartum depressive episode is coupled with entry of an infant into the family, the developmental tasks of parenting are affected. The negative effects of maternal depression for children include insecure attachment, impaired mental and motor development, poor self-regulation, low self-esteem, and behavior problems.¹² Exposure to postpartum depression increases the child’s vulnerability to depression through late adolescence independent of exposure to subsequent episodes of maternal depression.^{13,14} Therefore, strategies to reduce the risk for postpartum depression have the potential for major, multigenerational public health impact.¹⁵

The impact of emotional states on pain experience is widely recognized; however, pain and depression are often studied as separate constructs. Little has been published on the neurobiological basis of pain processing in individuals with MDD; however, increased emotional reactivity during the anticipation of pain impairs the capacity to modulate pain experience.¹⁶ The brain neural network activated during the experience of psychological pain overlaps with brain regions involved in physical pain.¹⁷ Emotions are often felt in the body (anxiety as stomach “butterflies,” grief as “heartache”), and somatic sensory feedback

may trigger conscious emotional experience. Emotions are associated with specific topographical body sites of sensations, which may be critical for complex emotional perception and serve a central role in emotional processing.¹⁸ The capacity to control reactions to emotionally charged information is compromised in women experiencing pain and/or MDD.^{19–21}

Cognitive processes contribute to pain perception. Childbirth pain, pain during breastfeeding, and depressive symptoms are associated with a cognitive style of catastrophization (ongoing view of pain as intolerable and not controllable).²² Women who catastrophize have more intense pain and worse physical recovery than women who do not. Catastrophizing is significantly associated with increased activity in brain areas related to pain anticipation (medial frontal cortex, cerebellum), attention to pain (dorsal anterior cingulate cortex, dorsolateral prefrontal cortex), emotional aspects of pain (claustrum, closely connected to amygdala), and motor control.²²

In this issue of the *Anesthesia & Analgesia*, Ding et al.²³ hypothesized that epidural labor analgesia was associated with a lower incidence of postpartum depression compared to patients who did not receive epidural labor analgesia. In this observational study from China, women's intrapartum analgesia choices were either epidural or no analgesia since other forms of analgesia were not available. Depression was evaluated with the Edinburgh Postnatal Depression Scale (EPDS),²⁴ the most commonly used screening tool for postpartum depression worldwide. The rate of postpartum depression (defined as an EPDS score of ≥ 10) was significantly lower in women who received epidural labor analgesia than women who did not (15 of 107 [14.0%] vs 37 of 107 [34.6%], $P < 0.001$). In an American study that also used an EPDS cutoff score of ≥ 10 , 14% of women ($n = 10,000$) at 4 to 6 weeks postpartum were identified as at risk for depression.¹⁵ These mothers were offered research diagnostic assessments,¹⁵ and $>90\%$ were confirmed to have a major mood disorder diagnosis (either unipolar major depression or bipolar disorder). Ding et al.²³ also found that epidural analgesia was an independent predictor of a lower prevalence of postpartum depression at 6 weeks postpartum (OR = 0.32, 95% CI, 0.11–0.89, $P = 0.029$). Evidence is accumulating that optimal acute pain control reduces the risk for postpartum depression.

Is pain reduction the mediator of the decreased risk for postpartum depression associated with epidural analgesia? Ding et al.²³ showed that epidural analgesia was effective for the treatment of pain. The mean pain rating score at 10 cm cervical dilation was significantly less for women who received epidural analgesia (3 on scale of 0 to 10) than in women who did not (10 on scale of 0–10, $P < 0.001$). However, women who chose epidural analgesia may have had characteristics associated with lower risk for postpartum depression than women who declined analgesia. Nonrandom treatment assignment is a design problem in such observational studies, but a randomized trial would be ethically and methodologically challenging to conduct. Ding et al.²³ provided a comparison of predelivery variables that might impact the outcome in women who requested versus declined epidural analgesia. A strength of the investigation is that these multiple demographic and clinical variables did not significantly differ between groups. Although this study does not establish biological cause and effect, demonstrating the association is sufficient to compel further testing of the

intriguing hypothesis that epidural analgesia, through pain management, mitigates the risk for postpartum depression.

In observational studies and in randomized trials, epidural analgesia is associated with a longer second stage of labor and use of exogenous oxytocin for stimulation of contractions.²⁵ Oxytocin administration is associated with decreased maternal levels of anxiety and aggression and increased adaptive behavior, both of which are associated with decreased depression risk.²⁶ Ding et al.²³ found that women who received epidural analgesia were significantly more likely to receive oxytocin before delivery (no analgesia 50.5%, epidural analgesia 66.4%; $P = 0.018$). However, all the women in the study received prophylactic oxytocin for active management of the third stage of labor. Indeed, the administration of oxytocin before delivery was not significantly associated with postpartum depression (OR = 0.96, 95% CI, 0.51–1.81; $P = 0.90$).

Ding et al.²³ also found that breastfeeding was more common at 6 weeks postpartum in the group who received epidural analgesia (no analgesia 49.5%, epidural analgesia 70.1%; $P = 0.002$). Studies have shown that mothers who do not initiate or maintain breastfeeding are at higher risk for postpartum depression. The pathway to failed lactation and postpartum depression has overlapping mechanisms, such as altered lactogenic and stress hormones, stress reactivity systems, pain perception, and thyroid homeostasis. Breastfeeding is also associated with higher sustained oxytocin (and prolactin) levels across the period of lactation. Breastfeeding is a critical postbirth behavioral adaptation that has a major impact on short- and long-term maternal and infant health outcomes as emphasized by the Surgeon General's Call to Action to Support Breastfeeding (www.surgeongeneral.gov/library/calls/breastfeeding/index.html). Reduction in the risk for infant disease related to breastfeeding (fewer infections, lower risk of asthma, reduced risk of sudden infant death syndrome, economic benefits) decreases the stressful challenges related to infant care in the postbirth period.

Optimal management of acute postpartum pain supports the new mother's capacity for attachment and infant caregiving. Improving pain control and reducing the short- and long-term sequelae of pain are crucial to support the developmental tasks of motherhood. The initiation of the postbirth period with maximal comfort sets in motion adaptive maternal behaviors and a positive emotional milieu for new motherhood. Understanding the shared and unshared mechanisms associated with peripartum pain and depression is a research goal that derives from these emerging studies. Clinicians should be aware that women who do not receive optimal pain management are at increased risk for depression and screening is recommended⁶; conversely, women with postpartum depression should be evaluated for acute and chronic perinatal pain.

REFERENCES

1. Hamilton BE, Martin JA, Ventura SJ. Births: preliminary data for 2012. Natl Vital Stat Rep. 2013; 62:1–20.
2. Eisenach JC, Pan PH, Smiley R, Lavand'homme P, Landau R, Houle TT. Severity of acute pain after childbirth, but not type of delivery, predicts persistent pain and postpartum depression. Pain. 2008; 140:87–94. [PubMed: 18818022]

3. Vermelis JM, Wassen MM, Fiddelaers AA, Nijhuis JG, Marcus MA. Prevalence and predictors of chronic pain after labor and delivery. *Curr Opin Anaesthesiol*. 2010; 23:295–299. [PubMed: 20446346]
4. Eisenach JC, Pan P, Smiley RM, Lavand'homme P, Landau R, Houle TT. Resolution of pain after childbirth. *Anesthesiology*. 2013; 118:143–151. [PubMed: 23249931]
5. Hiltunen P, Raudaskoski T, Ebeling H, Moilanen I. Does pain relief during delivery decrease the risk of postnatal depression? *Acta Obstet Gynecol Scand*. 2004; 83:257–261. [PubMed: 14995921]
6. Gaudet C, Wen SW, Walker MC. Chronic perinatal pain as a risk factor for postpartum depression symptoms in Canadian women. *Can J Public Health*. 2013; 104:e375–e387. [PubMed: 24183178]
7. Gaynes BN, Gavin N, Meltzer-Brody S, Lohr KN, Swinson T, Gartlehner G, Brody S, Miller WC. Perinatal depression: prevalence, screening accuracy, and screening outcomes. *Evid Rep Technol Assess (Summ)*. 2005; 119:1–8. [PubMed: 15760246]
8. Robertson E, Grace S, Wallington T, Stewart DE. Antenatal risk factors for postpartum depression: a synthesis of recent literature. *Gen Hosp Psychiatry*. 2004; 26:289–295. [PubMed: 15234824]
9. Kendler KS, Gardner CO, Prescott CA. Toward a comprehensive developmental model for major depression in women. *Am J Psychiatry*. 2002; 159:1133–1145. [PubMed: 12091191]
10. Heim C, Nemeroff CB. The role of childhood trauma in the neurobiology of mood and anxiety disorders: preclinical and clinical studies. *Biol Psychiatry*. 2001; 49:1023–1039. [PubMed: 11430844]
11. Gonzalez A, Boyle MH, Kyu HH, Georgiades K, Duncan L, MacMillan HL. Childhood and family influences on depression, chronic physical conditions, and their comorbidity: findings from the Ontario Child Health Study. *J Psychiatr Res*. 2012; 46:1475–1482. [PubMed: 22959202]
12. Davalos DB, Yadon CA, Tregellas HC. Untreated prenatal maternal depression and the potential risks to offspring: a review. *Arch Womens Ment Health*. 2012; 15:1–14. [PubMed: 22215285]
13. Murray L, Arteche A, Fearon P, Halligan S, Goodyer I, Cooper P. Maternal postnatal depression and the development of depression in offspring up to 16 years of age. *J Am Acad Child Adolesc Psychiatry*. 2011; 50:460–470. [PubMed: 21515195]
14. Pearson RM, Evans J, Kounali D, Lewis G, Heron J, Ramchandani PG, O'Connor TG, Stein A. Maternal depression during pregnancy and the postnatal period: risks and possible mechanisms for offspring depression at age 18 years. *JAMA Psychiatry*. 2013; 70:1312–1319. [PubMed: 24108418]
15. Wisner KL, Sit DK, McShea MC, Rizzo DM, Zoretich RA, Hughes CL, Eng HF, Luther JF, Wisniewski SR, Costantino ML, Confer AL, Moses-Kolko EL, Famy CS, Hanusa BH. Onset timing, thoughts of self-harm, and diagnoses in postpartum women with screen-positive depression findings. *JAMA Psychiatry*. 2013; 70:490–498. [PubMed: 23487258]
16. Strigo IA, Simmons AN, Matthews SC, Craig AD, Paulus MP. Association of major depressive disorder with altered functional brain response during anticipation and processing of heat pain. *Arch Gen Psychiatry*. 2008; 65:1275–1284. [PubMed: 18981339]
17. Meerwijk EL, Ford JM, Weiss SJ. Brain regions associated with psychological pain: implications for a neural network and its relationship to physical pain. *Brain Imaging Behav*. 2013; 7:1–14. [PubMed: 22660945]
18. Nummenmaa L, Glerean E, Hari R, Hietanen JK. Bodily maps of emotions. *Proc Natl Acad Sci U S A*. 2014; 111:646–651. [PubMed: 24379370]
19. Badre D, D'Esposito M. Functional magnetic resonance imaging evidence for a hierarchical organization of the prefrontal cortex. *J Cogn Neurosci*. 2007; 19:2082–2099. [PubMed: 17892391]
20. Cabeza R, Ciaramelli E, Olson IR, Moscovitch M. The parietal cortex and episodic memory: an attentional account. *Nat Rev Neurosci*. 2008; 9:613–625. [PubMed: 18641668]
21. Corbetta M, Patel G, Shulman GL. The reorienting system of the human brain: from environment to theory of mind. *Neuron*. 2008; 58:306–324. [PubMed: 18466742]
22. Flink IK, Mroczek MZ, Sullivan MJ, Linton SJ. Pain in childbirth and postpartum recovery: the role of catastrophizing. *Eur J Pain*. 2009; 13:312–316. [PubMed: 18515162]
23. Ding T, Wang D-X, Qu Y, Chen Q, Zhu S-N. Epidural labor analgesia is associated with a decreased risk of postpartum depression: a prospective cohort study. *Anesth Analg*. 2014; 119:383–392. [PubMed: 24797120]

24. Cox JL, Holden JM, Sagovsky R. Detection of postnatal depression. Development of the 10-item Edinburgh Postnatal Depression Scale. *Br J Psychiatry*. 1987; 150:782–786. [PubMed: 3651732]
25. Anim-Somuah M, Smyth R, Howell C. Epidural versus nonepidural or no analgesia in labour. *Cochrane Database Syst Rev*. 2005; 4:CD000331. [PubMed: 16235275]
26. Jonas W, Nissen E, Ransjö-Arvidson AB, Matthiesen AS, Uvnäs-Moberg K. Influence of oxytocin or epidural analgesia on personality profile in breastfeeding women: a comparative study. *Arch Womens Ment Health*. 2008; 11:335–345. [PubMed: 18726143]

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