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REVIEW ARTICLE

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The need for an epidural "window of opportunity" in pregnant women with a lumbar tattoo

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ABSTRACT
Pregnant women with lower back tattoos who wish to have an epidural placed during labour pose a dilemma to anesthesiologists. Clear guidelines have not been established. We reviewed the epidural risks in pregnant women with low back tattoos and have suggested precautionary measures to minimise them. Given the limited information available, and in the absence of a clear evidence-based medical contraindication, an epidural technique should not be excluded in those women with a lower back tattoo.
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Introduction

A tattoo is a marking, mostly for decorative purposes, made by inserting indelible ink into the dermis of the skin. The word "tattoo" is derived from the Polynesian word, 'tatao', which literally means "to mark someone".[1] Over the past 30 years, permanent tattooing has gained popularity worldwide among almost all demographic groups. A population-based survey among American individuals aged 18–50 years revealed that nearly 25% had tattoos, with a similar distribution among males and females.[2] Similar trends have recently been documented in France, Germany, Finland and Australia, where approximately 10% of their populations had at least one tattoo.[3]

Increasingly women of child-bearing age have tattoos, frequently in the lumbar and sacral areas. Pre-existing tattoos are not usually affected by the course of pregnancy, but may be on rare occasions.[4] Some anesthesiologists avoid inserting an epidural needle through a tattoo on the lower back because of theoretical maternal risks. Anonymous surveys of anesthesiologists reported no agreement about the provision of epidural anesthesia for pregnant women with lower back tattoos; in one, 40% of respondents indicated that they would not perform the procedure, and 70% reported no agreed departmental policy for their management.[5,6]

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Following a brief case description, we evaluate the potential risks when providing epidural techniques to pregnant women with a lower back tattoo, and suggest precautionary measures to minimize these risks.

Case presentation

A 26-year-old, healthy, nulliparous woman at 39 weeks of gestation was admitted after midnight to our labor ward in the latent phase of labor. Her low-risk pregnancy had been uneventful. Epidural analgesia was requested and a tattoo covering the lower back was noted (Fig. 1). The anesthesiology resident on-call was unsure about the safety of the procedure, and declined to perform the epidural. The next morning, after several hours of active labor during which time the woman experienced severe pain, epidural analgesia was performed by a consultant anesthesiologist in a small pigment-free area at the L3–L4 interspace. A normal vaginal delivery and postpartum course followed. No adverse outcomes related to the tattoo or epidural placement were reported.

Discussion

An online search for relevant articles about tattooing was conducted using an electronic database (MEDLINE®). No publishing date, language or location limitations were imposed. Keyword searches were performed using the words: "Epidural", "Regional anesthesia", "Body art", "Pregnancy", "Parturient", "Lumbar tattoo", "Low back tattoo" and "Coring". A number of potential complications were noted.

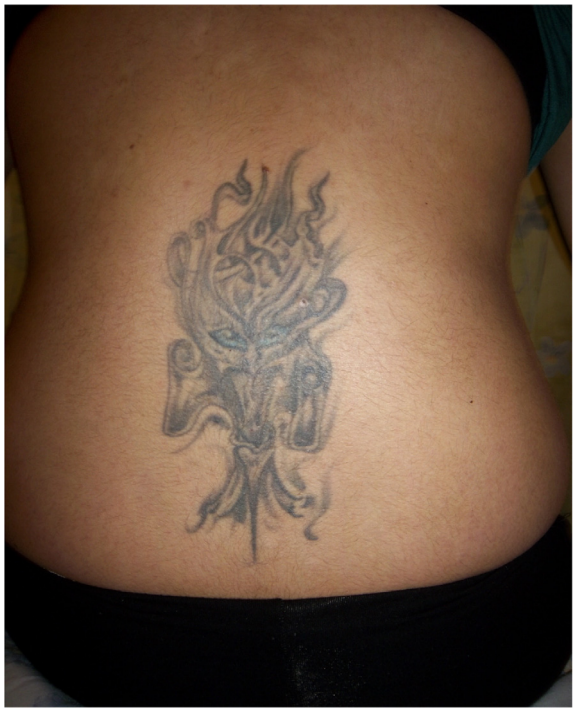

Fig. 1 Lower back tattoo in a parturient prior to neuraxial block (reproduced with permission)

Coring and the risk of an epidermoid tumor

The process of tissue coring can entrap epithelial fragments in the bore of hollow needles as they pass through deeper layers of the skin. Although an association between tissue coring and the development of epidermoid tumor has been proposed, the extent and frequency of coring is controversial. Ozyurt et al. studied the possible presence of epithelial cells in the cerebrospinal fluid immediately after introducing spinal needles of different diameter into the subarachnoid space.[7] Benign epithelial cells were found in each type of needle, with more cells present in the larger needles. A theoretical concern about tissue core containing pigment from a tattoo entering the epidural space and leading to an epidermoid tumor has been raised.[8] Although Whitacre needles and the newer variants of Quincke needles (styletted spinal needles) both cause coring, most of the tissue tends to be blood clot or fat, and not epidermal tissue.[9] One opinion is that tattoo ink remains fixed within the macrophages of the dermis and does not travel along a needle track, suggesting that there should be no danger from inserting a needle through tattooed skin.[10]

Risk of transmitting infection

During tattooing, the tattoo dye penetrates the dermis and comes into contact with the underlying blood and lymphatic vessels. Blood borne infectious complications such as hepatitis, syphilis, or human immunodeficiency syndrome occur rarely as a consequence of poor hygiene standards in the tattoo parlor.[11,12]

Skin reactions

The cutaneous incorporation of ornamental tattoo dyes is not an inert process. Non-specific macrophage activation and discrete inflammatory changes involved in the degradation of foreign material have been documented years after application of a tattoo.[13] Various types of skin reaction have been reported in tattooed areas: allergic contact dermatitis has mostly been related to metal salts used in permanent tattoos. Tattoo pigments contain a variety of allergenic substances, such as cadmium sulfide (yellow dye), iron oxide (brown dye), cobalt aluminate (blue dye), mercury sulfide (red dye), chromium oxide (green dye), magnesium (lilac dye), and carbon (black dye).

Identification of the allergens is often difficult since the components of the dyes often cannot be traced.[11] Allergen patch tests are often negative, possibly because suitable patch test solutions are difficult to obtain, due to the low dispersing capacities of most pigments.[14] Granulomatous reactions, caused by metallic salts in tattoo pigments, may be preceded by or associated with eczematous reactions. The lesion is usually non-itchy, but biopsy shows typical granulomas. Patients with these reactions usually have positive patch test reactions to the respective metallic salts.[15] Lichenoid reactions have been described in association with permanent red tattoos, in which nickel was suspected to have an etiologic role.[16] Cutaneous pseudolymphoma represents benign lymphoproliferative disorders, although the mechanism by which this develops is unknown. Few cases: have been documented, but in all the infiltrate was localized in the red area of the tattoo. Most are likely to be due to chronic antigen stimulation caused by the red exogenous pigment in the dye, which acts as an antigen and leads to proliferation of lymphoid cells.[17] The pigment is pushed directly into the dermis, resulting in elimination of epidermal Langerhans cells. Immunohistochemistry shows that pseudolymphomas seen after tattooing are usually of a B-cell type.

Neurological manifestations

Steiner et al. described three cases of focal neuromuscular dysfunction that developed three to six months after tattooing, adjacent to the area of atrophy.[18] They hypothesized that the mechanism was "an immune-mediated reaction secondary to local inflammatory changes or toxic effect of the pigment." In addition, an immunologic response to a possible blood borne infecting pathogen as the primary source of plexopathy has not been tested. A recent animal model showed that intrathecal injection of saline through a needle inserted

through tattooed skin is capable of producing histological changes in the meninges of rabbits.[19] However, there is no evidence in humans that tattoo pigments cause neurological complications.

Women with lower back tattoos who request epidural analgesia in labor may cause concern to some anesthesiologists and there are no guidelines to aid decision making.

Epidural analgesia offers the most effective pain relief during labor, and is widely requested globally.[20] According to some, the administration of a neuraxial block to parturients with a lumbar tattoo is controversial.[4–6,8] Some anesthesiologists apparently are unwilling to provide epidural analgesia in labor,[5,6] although this view is contrary to the recommendations of American societies which state that a maternal request is a sufficient medical indication for pain relief during labor.[21,22] There are also no consensus guidelines for other specialists who may perform neuraxial procedures, for example neurologists, pain specialists and rheumatologists.

Complications such as infection, skin reactions and neurological manifestations are related to the actual procedure of tattooing. The data regarding tissue coring and epidermoid tumor formation are reassuring, and it appears that the risk of their development after neuraxial procedures is likely to be extremely low, albeit currently unquantifiable.

Very large case series of women with lower back tattoos, to whom epidural techniques are administered, are needed to determine the incidence of complications and hence guide recommendations. In the meantime, we suggest, based on the limited information available, adherence to the following precautionary measures:

1. The Food and Drug Administration (FDA) encourages health care providers, public health officials, consumers, and tattoo artists to use MedWatch to report infections or other adverse events related to tattooing.[23]
2. Ideally, tattoo artists should discuss the potential risks associated with tattoos, particularly among reproductive aged female population.
3. Pregnant women with lumbar tattoos may wish to consult an anesthesiologist prior to labor. A signed informed consent for administration of an epidural is recommended.[24]
4. Epidural administration at fresh tattoo sites (<2 weeks old) should be avoided.[25]
5. Maintenance of sterility is essential. The anesthesiologist is advised to wear cap, mask and gloves during neuraxial anesthesia.[26]
6. Injection through the tattoo ink should be avoided where possible, by using a different vertebral interspace, a paramedian approach, or a pigment-free area of skin.[24]
7. A spinal needle of 18-gauge may reduce the possibility of tissue coring.[7]
8. Nicking the skin prior to inserting an epidural or spinal needle may reduce the absorption of pigments disturbed by tissue coring.[9] However, this may distort the original tattoo, and consent should be obtained.

In our opinion, despite the absence of evidence-based guidelines, anesthesiologists should not withhold neuraxial techniques from women with lower back tattoos.

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