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## Anesthesia for Cesarean Section in Patients with Genital Herpes Infections: A Retrospective Study

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### METHODS

Patients with genital herpes simplex virus-2 (HSV-2) infection often require cesarean section to minimize the risk of neonatal HSV-2 infection and its high mortality rate.<sup>1</sup> The HSV-2 is a neurotropic virus that persists in sensory ganglia and postganglionic nerve fibers.<sup>2</sup> Regional anesthesia may be contraindicated in patients with HSV-2 infection because of possible dissemination of the infection. Relapses of herpes zoster lesions can occur following spinal anesthesia.<sup>3</sup> General anesthesia may also be hazardous in these patients because the anesthetics cause immunocompromise by: 1) affecting the function of bursa and thymus-dependent lymphocytes (B- and T-cells)<sup>2,4-6</sup>; decreasing cell motility and division, which results in decreased proliferation of lymphoid tissue in response to pathogens; and 3) by interfering with phagocyte mobilization.<sup>6</sup> Hormonal responses to the stress of surgery may also interfere with host defense mechanisms.<sup>6</sup> In addition, pregnancy itself may cause immunosuppression.<sup>7</sup> We describe our experience with lumbar epidural anesthesia and general anesthesia in patients with recurrent HSV-2 infection.

The study period extended from the years 1979 to 1984. All patients in the study were scheduled for cesarean section. Viral cultures were obtained from all genital lesions at least once during pregnancy. Culture studies were performed by the Smith-Kline Bioscience Laboratories (King of Prussia, PA). The laboratory uses the cell-culture technique for isolating the virus. The choice of anesthesia was at the discretion of the anesthesiologist. Some members of the anesthetic staff used general anesthesia in all patients with a history of HSV-2 infection regardless of the date of the positive culture because they felt that regional anesthesia was contraindicated in these patients. However, other members used regional anesthesia regardless of the date of the last positive culture report.

General anesthesia was induced by the iv injection of thiopental 3 mg/kg. The trachea was intubated under succinylcholine-induced muscle paralysis. Anesthesia was maintained with 70% N<sub>2</sub>O in oxygen supplemented by intermittent iv administration of fentanyl in 50 µg increments. Muscle paralysis was maintained with 6 mg incremental iv injections of *d*-tubocurarine. Muscle paralysis was reversed at the end of the procedure with a mixture of 1 mg atropine and 3 mg neostigmine iv. The tracheas were extubated uneventfully in the operating room.

Patients scheduled to receive lumbar epidural anesthesia were given an iv infusion of 1200 ml lactated Ringer's solution. Epidural anesthesia was induced to T6-T4 level by injecting 5 ml increments of lidocaine 1.5% with

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TABLE 1. Site of Herpetic Lesions

Site of Lesion	Anesthesia	
	General (n = 28)	Epidural (n = 48)
Genital (cervical and vulval)	20	29
Sacral, gluteal	3	3
Extragenital*		
(excluding sacral, gluteal)	1	2
No demonstrable lesion	4	14

\* Lesions were noted on fingers and eyelids.

1:200,000 epinephrine through a catheter inserted through the L3-L4 or L2-L3 intervertebral space. Left uterine displacement was maintained until the baby was born. Any systolic pressure less than 100 mmHg was promptly treated by injecting 5 mg increments of ephedrine. After delivery of the infant, 5-10 mg diazepam and/or 50-100 µg fentanyl were given iv for sedation as needed. Patients with active herpetic lesions and/or those who had a positive virus culture report in the last 1 month were kept in isolation in the postpartum period in accordance with the infection control policies of the hospital and their babies were kept in a special nursery until discharge.

The postoperative course of all patients was reviewed for the: 1) presence of symptoms and signs of encephalitis, *e.g.*, headache, persistent unexplained pyrexia >39.5° C; 2) presence of signs and symptoms of meningitis, *e.g.*, headache, pyrexia, and nuchal rigidity; and 3) development of new lesions and/or the reactivation of the existing ones. In addition, the nursery course of all babies was reviewed for the presence of neonatal HSV-2 infection, mainly encephalitis.

## RESULTS

There were 21,612 deliveries in our institution during the study period, and 76 patients required anesthetic for cesarean section who had HSV-2 infection. Twenty-eight were given general anesthesia and 43 were given epidural anesthesia. The sites of herpetic lesions are summarized in table 1. The majority of patients had demonstrable

TABLE 2. Number of Instances of herpes Simplex (type 2) Virus (HSV-2) Isolation

Isolation of HSV-2	Anesthesia	
	General n = 28	Epidural n = 48
Positive in the last month	7	25
Positive in the first 8 months	5	5
Negative in the last month	7	14
Report not available	9	4

lesions confined either to the cervix uteri or the vulva at the time of surgery. Some had extragenital lesions in the back and buttocks. One patient who received general anesthesia had a lesion on the eyelid and two patients who received epidural anesthesia had lesions on the fingers. Sixteen per cent of patients who received general anesthesia and 29% of those who received lumbar epidural anesthesia had no demonstrable lesions at the time of the anesthetic but they have had at least one recurrence during the present pregnancy.

Table 2 lists the frequency of positive HSV-2 isolation. Forty-two patients from both groups had a positive isolation at least once during pregnancy, 32 of whom had a positive culture in the last month. Two patients converted from a positive to a negative status in the last month of pregnancy and in 19 patients, available reports indicated that the cultures were negative in the last month of pregnancy. Reports were not available in 13 patients.

One patient who received epidural anesthesia was given dexamethasone in the prenatal period to promote fetal lung maturity, and she had recurrence of a vulval lesion in the postnatal period. The lesion healed promptly within 10 days. Another patient was given 5 mg prednisone, once daily, for idiopathic thrombocytopenic purpura. Her platelet count was normal at the time of delivery. A general anesthetic was attempted but abandoned because of difficulty in intubating the trachea. She was then given an epidural anesthetic uneventfully. This patient developed pyrexia of >40° C that was later shown to be due to *Staphylococcus aureus* endometritis proven by blood and lochial cultures. None of the other patients who received general or epidural anesthesia developed any neurologic or anesthetic complication. None had recurrences of local lesions. One neonate from each group developed physiologic jaundice, and all other neonates had an uneventful nursery course.

## DISCUSSION

The risk of HSV-2 virus is increasing steadily and in some population groups is now the most commonly transmitted sexual disease.<sup>8,9</sup> Anesthesiologists are likely to be asked to provide services to these patients more frequently now than in the past. Our data show that both general and epidural anesthesia are safe for the mother and the baby in the presence of recurrent HSV-2 infections. There was one minor recurrence following epidural anesthesia in one patient who received steroids, which are known to cause immunocompromise. The surgical stress may also have played a role in causing the recurrence in this patient.

There are several methods of laboratory diagnosis of HSV-2 infection, including: 1) growing of the virus in a cell culture; 2) detection of the virus by immunologic methods such as immunofluorescence antibody technique

or immunoperoxidase staining; 3) demonstration of viral cytopathologic effect; and 4) serodiagnosis. The cell-culture method that was used in our study is the most definitive of all methods. The sensitivity of any laboratory test depends not only on the type of lesion but also the stage of healing. Vesicular lesions yield the greatest number of positive results, and the encrusted lesions yield the smallest number.<sup>8</sup> Thus, a negative viral report does not rule out viral shedding.

Genital herpes infection is caused by two different subtypes of viruses, HSV-1 and HSV-2. The HSV-1 subtype is responsible for 7% of all primary infections and only 2% of all the recurrent infections. On the contrary, the HSV-2 subtype causes the majority of primary infection and almost all of the recurrent episodes. The primary episode is associated with viremia and, therefore, produces more severe generalized symptoms than do the subsequent episodes. The primary symptoms include fever, lymphadenopathy, headache, and other signs of meningeal irritation. The lesions take longer to heal, and positive viral isolation is more frequent.<sup>8</sup> Transplacental passage of the virus also occurs during primary episodes. On the other hand, secondary episodes do not cause generalized symptoms and almost always produce only local recurrences.<sup>9</sup> The results of our study are applicable only to the secondary lesions and not to the primary episodes. In our study, three patients from the epidural group had lesions confined to sacral or gluteal area but none had lesions in the lumbar area.

The Society for Obstetric Anesthesia and Perinatology (SOAP) has conducted a survey to see if its members were in favor of administering regional anesthesia to patients with herpes infections. The results of the survey were published in the *SOAP Newsletter*.<sup>§</sup> The members have collectively seen 3,000 patients with herpes infection. Most members used spinal or epidural anesthesia in patients with only past history of herpes. However, more than one-third of the members would not use regional anesthesia if their patient had an active primary lesion, espe-

cially in the presence of generalized symptoms. Another report has described the safe use of epidural anesthesia in 30 pregnant patients with HSV-2 infection.<sup>10</sup> This report, however, does not say whether the infections were primary or secondary in nature. Neither does it include culture reports.

In summary, the results of our study show that both general anesthesia and lumbar epidural anesthesia appear to be safe for the mother and her baby in the presence of HSV-2 secondary infection. A positive viral isolation in the last month of pregnancy or the presence of active secondary lesions may not be a contraindication for regional anesthesia. The selection of the anesthetic technique must be based on the patient's choice and the demands of the situation. Our data, however, do not apply to patients with primary lesions.

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