Pregnant Woman Bitten by a Japanese Mamushi

(Gloydius blomhoffii)

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Abstract

We herein report the fourth case of a pregnant woman bitten by a mamushi. A 33-year-old pregnant woman in the 25th week of gestation was bitten by a mamushi. Her vital signs were stable; however, biochemical analyses of the blood showed mild deterioration of anemia and hypoproteinemia. The effects of envenomation were limited to the extremities, the administration of supportive therapy without antivenom fortunately resulted in a favorable outcome. As there are differences in the maternal medical condition and weeks of gestation, further research is needed to clarify the optimal management strategy for administering antivenom in pregnancy.

Key words: mamushi, pregnant, antivenom

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Introduction

The Japanese mamushi, Gloydius blomhoffii, is a species of pit viper found throughout Japan, except on the southeast islands (1). The characteristics of a mamushi bite include one or two small wounds induced by venom fangs or one or two linear wounds produced by the withdrawing motion of the teeth. Meanwhile, the characteristics of Rhabdophis tigrinus (YAMAKAGASHI) and Elaphe climacophora (AODAISHO) bites include multiple biting wounds forming one or two rows of symmetric linear curves (Fig. 1). The venom of mamushi mainly consists of multiple enzymes that work as hemolytic toxins, including: phospholipase A2, neurotoxins; an alpha-toxin/ beta-toxin, increased vascular permeability; arginine ester dehydrogenase, rhabdomyolysis; endopeptidase/bleeding factor (HR1 or HR2), platelet aggregation; L-amino acid oxidase (1, 2). One thousand cases of mamushi bites, resulting in 10 deaths, are estimated to occur annually (3, 4). Causes of mortality include circulatory collapse, respiratory insufficiency, bleeding tendencies and renal failure induced by rhabdomyolysis. In Japan, the use of antivenom and/or cepharanthine is the standard treatment for mamushi bites (3). However, antivenom has the potential to cause anaphylaxis and serum diseases; therefore, physicians tend to hesitate to apply this treatment in mild cases (3). Furthermore, the side effects of antivenom with respect to the fetus are unknown, and there is only a single report of the administration of antivenom in pregnancy and only two cases of mamushi bites in pregnant women treated without antivenom in Japan (5). We herein report the fourth case of a pregnant woman bitten by a mamushi.

Case Report

A 33-year-old pregnant woman in the 25th week of gestation was bitten by a mamushi viper when she visited a hot spring on Izu peninsula. She was treated at a local medical facility and subsequently transferred to our department; she had no particular past or family history. Upon arrival, her consciousness was clear, with a blood pressure of 120/50 mmHg, heart rate of 80 beats per minute (BPM), SpO2 of 97% under room air and body temperature of 36.7 Celsius. Her left second toe displayed two bite wounds (Fig. 2), and her left leg was swollen up to the upper knee; hence, we judged that the venom of the mamushi had entered her body. She did not report double vision. An electrocardiogram showed normal findings, and the results of the bio-
of cepharanthine, toxoid for tetanus, antibiotics and rito-
drine. The fetal heartbeat was within the normal limits. On
the second hospital day, the patient’s leg was observed to be
swollen up to the hip joint, and she felt pain in the left in-
guinal lymph node, corresponding to a grade IV mamushi
bite (Fig. 3). She also felt palpitations and dysesthesia of the
hands induced by the use of ritodrine. However, biochemical
analyses of the blood disclosed only mild deterioration of
anemia and hypoproteinemia (Fig. 4). The patient’s urinary
flow continued to be normal, and the fetal heartbeat re-
mained within the normal limits. Although the leg swelling
deteriorated up to the fourth hospital day, without any signs
of compartment syndrome, the patient’s vital signs remained
stable and further biochemical analyses of the blood showed
only additional mild deterioration of the anemia. Starting on
the fifth hospital day, both the leg swelling and data for the
biochemical analyses of the blood improved, with the excep-
tion of anemia (Fig. 4). The fetal heartbeat continued to re-
main within the normal limits. On the eighth hospital day,
after confirming an improvement in the patient’s condition
and stabilization of the fetal heartbeat, the patient was trans-
ferred to a medical facility near her homeland. Her hemo-
globin level was not restored until the eighth hospital day;
however, she did not show any signs of disseminated in-
travascular coagulation (DIC) and other findings, such as the
swelling, pain and other laboratory data, subsequently im-
proved. Accordingly, we predicted a spontaneous improve-
ment in the hemoglobin level. There were no further
changes in her status or that of the fetus, and she was dis-
charged after seven days at another hospital (15th day after
the mamushi bite). On the second day of the 41st week of
pregnancy, the fetus exhibited fetal distress, and emergency
Caesarian section was thus performed. Both the mother and
baby were discharged without abnormalities within one
week.
Figure 4. Time course of biochemical findings of the blood. The biochemical analysis showed no critical results during hospitalization. CPK: creatine phosphokinase, WBC: white blood cells, Crea: creatinine, APTT: activated partial thromboplastin time, PT: prothrombin time, ALT: alanine aminotransferase, Hb: hemoglobin, TP: total protein

Table. Cases of Mamushi Bites during Pregnancy.

<table>
<thead>
<tr>
<th>Reference</th>
<th>Age</th>
<th>Gestation</th>
<th>Treatment</th>
<th>Cepharan- thine</th>
<th>Anti- venom</th>
<th>Symptom</th>
<th>Grade</th>
<th>Survival</th>
<th>Sequelae</th>
<th>Fetus</th>
<th>Abnormality</th>
</tr>
</thead>
<tbody>
<tr>
<td>No.6</td>
<td>29</td>
<td>10</td>
<td>ulinastatin, hydrocortisone, gabelexate mesylate, antibiotics</td>
<td>yes</td>
<td>no</td>
<td>extremely swollen, oculomotor nerve paralysis, rhabdomyolysis</td>
<td>III</td>
<td>yes</td>
<td>none</td>
<td>abortion</td>
<td>NA</td>
</tr>
<tr>
<td>No.7</td>
<td>28</td>
<td>34</td>
<td>prednisolone</td>
<td>yes</td>
<td>yes</td>
<td>extremely swollen, oculomotor nerve paralysis, rhabdomyolysis</td>
<td>V</td>
<td>yes</td>
<td>scar of wound</td>
<td>fetal distress</td>
<td>none</td>
</tr>
<tr>
<td>No.5</td>
<td>42</td>
<td>30</td>
<td>?</td>
<td>yes</td>
<td>yes</td>
<td>extremely swollen, oculomotor nerve paralysis, renal failure</td>
<td>V</td>
<td>yes</td>
<td>?</td>
<td>?</td>
<td>?</td>
</tr>
<tr>
<td>Present</td>
<td>33</td>
<td>25</td>
<td>toxoid for tetanus, antibiotics, ritodrine</td>
<td>yes</td>
<td>no</td>
<td>extremely swollen, anemia</td>
<td>IV</td>
<td>yes</td>
<td>none</td>
<td>survive</td>
<td>none</td>
</tr>
</tbody>
</table>

C: Caesarean section
NA: not applicable
?: not described

Discussion

To the best of our knowledge, there are three reports of mamushi bites in pregnancy, with our case being the fourth case reported in Japan (5-7). These cases, including the present case, are summarized in Table. The patients’ ages ranged from 29 to 42 years, with an average of 33 years, and the period of gestation ranged from 10 to 30 weeks, with an average of 24 weeks. Two of the four patients received antivenom (one received this treatment after undergoing Caesarean section). All mothers survived, although one fetus died, while two fetuses survived and were born without abnormalities. The remaining fetus survived after the mamushi bite; however, the final outcome (i.e., a normal delivery without abnormalities) was not described.

Langley et al. summarized 213 cases of pregnant women bitten by snakes in the period from 1966 to 2009 (8). The patients’ ages ranged from 14 to 46 years, with an average of 26 years. The week of gestation ranged from 6 to 37 weeks, with an average of 22 weeks of gestation. Among the 213 pregnant women bitten by snakes, 96 received antivenom. The mortality of the patients who received antivenom was lower than that of the patients treated without antivenom (2.1% vs. 6.6%), whereas the rate of fetal loss increased with the use of antivenom (30.2% vs. 11.3%).
timing of fetal loss was between 30 minutes and eight days after the bite. Based on these findings, Brown et al. (9) suggested that the use of antivenom should be considered in cases of envenomation during pregnancy, which is usually required for definitive management or in patients refractory to initial supportive care. The application of a minimum of eight hours of fetal heart rate (FHR) monitoring for up to one week is helpful in identifying pregnancies at risk for adverse outcomes. The present patient was at 25 weeks of gestation, and the effects of envenomation were limited to her extremities, such that the administration of supportive therapy only without antivenom fortunately resulted in a favorable outcome.

A foreign report recently recommended the infusion of antivenom for pregnant woman; however, both the kind of snake and antivenom in that report were different from Japanese venomous snakes. In addition, there is only one case report involving the infusion of antivenom in a pregnant woman in Japan, which did not describe the final outcome of the fetus (5). Accordingly, the safety of antivenom for the fetus in Japan has not been established. Principally, the first priority is to save the pregnant woman’s life, rather than the fetus. However, the patient wished to not receive the antivenom in order to save the fetus. Fortunately, she did not show any signs of multiple organ failure or disseminated intravascular coagulation, even as the swelling of the extremities expanded to grade IV. Therefore, we decided not to infuse the antivenom, and a favorable outcome was obtained for both the mother and fetus. As there are differences in the type of snake, antivenom, toxicity to humans, maternal medical condition and weeks of gestation, further research is needed to obtain data on the specific species of snake and clarify the optimal management strategy for administering antivenom in pregnancy.

The authors state that they have no Conflict of Interest (COI).

References