

Misdiagnosed *Vipera* envenoming from an unknown adder locality in northern Hungary

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Received: 23. June 2010 / Accepted: 31. January 2011 / Available online: 13. February 2011

Abstract. We report a misdiagnosed *Vipera* envenoming from northern Hungary from an as yet unknown viper-locality. A 64-year-old previously healthy male was bitten in the Bükk Mountains in July 2009, and has not presented at a doctor on the day of accident, although he suffered from mild and transient systemic symptoms and moderate local consequences following the bite. First the case was misdiagnosed and it was not handled as a possible adder-bite in a General Practitioner's office, despite the unambiguous visible local reactions. Eventually he was admitted to the medical centre of the county, the Borsod-Abaúj-Zemplén County and University Hospital in Miskolc, where fluid replacement and corticoid therapy were performed. Based on the symptoms we attribute the incident definitely to envenoming by a viper. The presence of an isolated natural Common adder (*Vipera berus*) population in this locality cannot be completely excluded, since the closest population is reported from Monok in the Szerencs Hills (which is geologically connected to the Zemplén Hills, that has one of the highest adder population densities in the country), approximately 45 km from the place of this incident. The occurrence of another captive-kept, but released, European viper species may be an alternative, but quite implausible explanation. This is the first envenomation reported outside the known Hungarian range of *V. berus*. The case highlights the possibility to enhance biogeographic data on certain species by using reports from different scientific fields such as clinical toxicology and emergency medicine, especially when the geographic distribution of venomous snakes is surveyed; thus analysis of available clinical records is highly encouraged.

Key words: envenoming; edema; latent paresis; Bükk Mountains;
Vipera berus, Borsod-Abaúj-Zemplén County.

Introduction

In Hungary today, envenomings by the two native *Vipera*, the Common adder (*Vipera berus*, Linnaeus, 1758) and the Hungarian Meadow viper (*Vipera ursinii rakosiensis*, Méhely, 1893) are relatively rare with a mean annual morbidity rate of 0.46 or 0.0046/100,000 inhabitants, estimated for both species (Malina et al. 2008a). From the medical and toxicological points of view, only *V. berus* can be significant in the country. However, the exact incidence rate of envenomings by *V. berus* is unknown up to now, though it seems to be much less frequent than in any other European country where the species occurs. The adder has a well-documented distribution in Hungary, occurring in three separated regions of the country: in the Northeast in Borsod-Abaúj-Zemplén County (Zemplén Hills and the Eperjes-Tokaj Range), in the East in Szabolcs-Szatmár-Bereg County (valley of the River Upper Tisza), and in the southwestern part of the country in Somogy and Zala Counties

(Janisch 1987, Korsós & Krecsák 2005). The adder has the widest distribution range in Borsod-Abaúj-Zemplén County (Fig. 1), and very probably one of the highest population densities in the Zemplén Hills (Somlai - pers. comm. 2010).

Here we review a misdiagnosed *Vipera*-bite, which occurred in the mid-summer of 2009 outside the known Hungarian distribution range of *V. berus*, but close to a known adder locality. The case was extensively reported in the Hungarian media, as well.

Case report

A 64-year-old previously healthy male without allergic background, was bitten by a snake near Kékmező (48°2'0"N; 20°43'0"E) in the Bükk Mountains (Fig. 1), Borsod-Abaúj-Zemplén County, Northern Hungary at 3 pm. on 14 July 2009.

The snake struck three times repeatedly with

two fangs - through the shirt -, and then escaped. The patient stated that he did not tease or attempt to catch it. The animal was invisible by the victim in those minutes when he was sitting and resting on a stone. He realized the presence of the snake in that moment when he suddenly noticed a burning, sharp pain on his right forearm. The specimen was circa 50-60 cm in length and 3 cm thick, with brownish background color and dark zigzag pattern, based on the patient's description. The patient has not received any first aid after the incident. Within 20 min., strong nausea, shivering and intense dizziness started to develop; then he experienced retrosternal pain with palpitations and "spark vision". Approximately an hour after the bite he lost consciousness. The episodes of unconsciousness repeated four times, the longest lasting more than 1 hour. When he regained consciousness, the edema had already extended to the hand, the fingers and to the forearm, 5 cm proximally from *fossa cubiti*. He did not present to a doctor on the day of the accident, since his systemic symptoms started to resolve in the evening and he thought his stage could not be worse.

On 15 July: he eventually visited his general physician (GP) next day because of the painful erythematic edema. Two ampules of calcium injection (2x500 mg calcium gluconate - Calcimusc®, Richter Gedeon PLC.) were administered intramuscularly (i.m.) by the physician, who did not recognize the potential fact of snakebite. However, the patient mentioned to the doctor that he was bitten by a viper on the previous day, and tried to insist that he is able to differentiate a viper from a harmless species, e.g. Smooth snake (*Coronella austriaca*). The patient was not forwarded to admission to the closest local hospital.

On 16 July: the patient presented to the local city hospital on his own decision the next morning. He was admitted to the Emergency Ward of Miskolc Semmelweis Ignác Health Centre and University Hospital (Miskolci Semmelweis Ignác Egészségügyi Központ és Egyetemi Oktató Kórház, Sürgősségi Betegellátó Osztály, Miskolc) because of his still persisting local symptoms and protracted diarrhea (black colored liquid feces, which lasted for two days). The patient's heart rate and blood pressure were not abnormal, while these values are unknown, as were his blood and urine levels on the day of his accident. He received crystalloid infusion (2x500 ml Ringer lactate) with 125 mg methylprednisolone sodium succinate (Solu-Medrol®, Pfizer Ltd.) intravenously (i.v.) for

the evolved edema. He was discharged in the afternoon on the same day.

On 17 July: the patient returned to the same hospital (Miskolc Semmelweis Ignác Health Centre and University Hospital, Miskolc) complaining of persistent but less serious local symptoms (Fig. 2a), and was remitted to the hospital's Dermatology Ward, then forwarded to the regional toxicology center, the Neurological-Toxicological-Stroke Ward of Borsod-Abaúj-Zemplén County and University Hospital, Miskolc (Borsod-Abaúj-Zemplén Megyei Kórház és Egyetemi Oktató Kórház, Neurológiai-Toxicológiai-Storke Osztály). On admission two fang marks were still clearly visible in three different places ulnary on the right forearm (Fig. 2b), and erythema with limited local swelling could be observed, which was still painful upon palpation. Latent paresis was detected on the bitten hand: handshake was weaker and lumpish, disorder in fine movements involved slower ring configuration with the fingers. The victim complained of significant joint pain in his bitten extremity, involved the metacarpal and interphalangeal joints together with cubital joint, but did not show systemic symptoms. Complete recovery took 4 days.

Discussion

Adders have not been known from the area where this accident derives from. Very probably this may have deceived the general physician in the local GP office, despite the fact that clear dual fang marks and typical local symptoms - painful erythematic edema - of a viper envenomation (i.e. Persson 2001) could still be observed on the bitten extremity. The systemic symptoms reported by the patient seem additionally to underpin the fact of envenoming by a viperid species, since all of those symptoms can be the early symptoms of European viper-envenomings (Meier & White 1995, Persson 2001). Though, of the systemic symptoms only persistent diarrhea was recorded on hospital admission. The arthralgia of the bitten hand can also be associated with the late local features of viper envenomings (Malina et al. 2008b). As Hungarian physicians often handle the complaints and stories of elderly patients perfunctorily, thus the victim's incredible case history and complaints were considered to be caused by a non-venomous bite associated with allergic skin reactions.

Unfortunately, many Hungarian county hos-

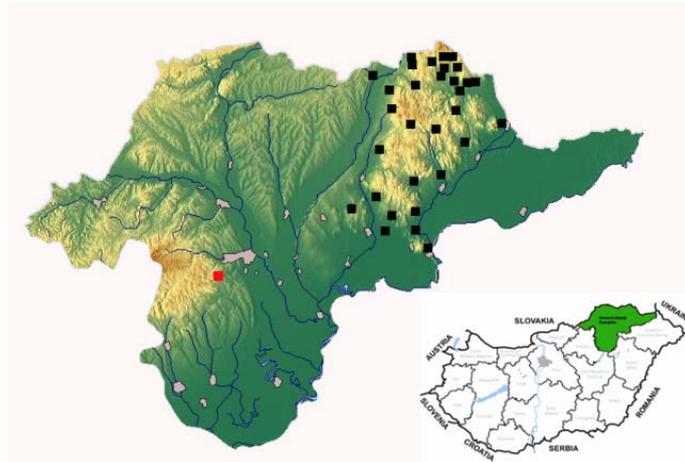


Figure 1. Location of *Vipera berus* populations in Borsod-Abaúj-Zemplén County, north-eastern Hungary [Red square= Kékmező, the locality where our patient was bitten. Black squares= known adder populations].



Figure 2. The bitten forearm on the third day of the bite after Calcium administration and corticosteroid therapy [a) limited local swelling and erythema; b) multiple adder-bite wounds with typical dual fang marks on three different places ulnarly on the forearm (Photograph by Dr. Zsuzsanna Károlyi)].

pitals are not prepared to treat adder-bites adequately, as indicated by the misadministration of antivenom in many cases or the treatment of bites by non-venomous species (i.e. *Coronella*, *Zamenis*) as adder-bite and *vice versa* (Virágh & Tass 1986, Malina et al. 2008a). One exception is the Clinical Toxicology Ward and Casualty Centre of Péterfi Sándor Street Hospital in Budapest (Péterfi Sándor Utcai Kórház Rendelőintézet és Baleseti Központ, Klinikai Toxikológiai Osztály, Budapest), the main

and the most developed snakebite-treatment center and hospital in Hungary, which is able to handle, and is prepared to adequately treat the most extraordinary emergency situations as well, including bites by exotic venomous “pets” (Malina et al. 2008a). Some envenomings are misdiagnosed occasionally in the regional areas where the native adder-bites can occur. Virágh and Tass (1986) reported 12 cases inflicted by native snakes (involving the harmless *C. austriaca*) in the Zemplén Hills

(NE Hungary), of which only two were identified as true adder-bite. In our view, two cases that were reported from *V. berus* habitats, have been misclassified by these authors as non-adder bites, since one was a dry-bite, while the other resulted in local swelling with erythema, headache and dizziness (Virágh & Tass 1986). A further problem is that most of the physicians in the local and regional Hungarian hospitals have limited practice in the treatment of snakebites, as they treat on average 2-3 *V. berus* inflicted cases annually. However, sometimes years can pass without any incident that was caused by this species.

The patient was admitted to hospital only on the second day, when his local symptoms were already moderated, mainly due to the i.m. Ca administration, which may have contributed to the patient's discharge on the same day. However, careful 24 h medical observation is important in every snakebite accident with early clinical improvement obviating the need for any medical intervention, except for the completely asymptomatic "dry-bites". On the other hand, elderly victims often respond worse to the acute envenoming than healthy adults and/or younger patients (Evers et al. 2010), most probably because of their different biochemical metabolism (Meier & White 1995), and especially, if co-morbid conditions are associated with the bite (Otten 1998): therefore, immediate and continuous 24 h medical observation would have been advised in our patient, as well. Nevertheless, fatal outcomes by adder envenomings are not common in Europe (Warrell 2005, Karlson-Stiber et al. 2006, Evers et al. 2010, Magdalan et al. 2010) but can occur. The risk for a fatal bite is higher in case of the elderly age group as such fatalities are reported by several authors (Reid 1976, Karlson-Stiber et al. 2006, de Haro et al. 2009, Anonymous 2010). Laboratory analysis was not performed in our patient because of the present Hungarian sanitary and economical situation, which focuses to save money. In our opinion, the snake bit multiple times because its fangs probably hitched to the shirt, and the victim was bitten when he tried to remove the animal.

This accident occurred outside the known NE Hungarian distribution range of the native *V. berus* but very close to its known localities within this county. The area (Kékmező, from where our accident derives) is abounding in mountain-meadows and clearings, the annual average temperature is +8-9 °C, the rainfall is 650-830 mm annually, and the 150-200-year-old and intact scrub-

lands and forests are common (Demeter et al. 2002), thus the area may hide an adder population. However, this eastern region of Bükk Mountains has been intensively surveyed in the last decade (e.g. Dely 1996), *V. berus* was not yet recorded. *Coronella austriaca* that is often sympatric with *V. berus* in Hungary, has been observed on several occasions in Kékmező (Demeter 2002). The closest *V. berus* population can be found near Monok (voucher specimen, Hungarian Natural Museum, Budapest HNHM 1977/2, Monok, leg. Horváth R. 1988) in the Szerencs Hills, which are geologically connected to the Zemplén Hills, approximately 45 km from the place of this accident. Therefore, we deem the incident was inflicted by *V. berus*. The eye-witness report also confirms it. The presence of an isolated natural adder population or captive-kept specimen(s) released in this locality cannot be completely excluded, while the occurrence of another captive-kept, but released, European viper species may be a quite implausible alternative explanation.

This case unfortunately certifies that the possibility of development of this clinical picture often does not emerge at the local GP offices and/or in the regional health centers. Thus the misdiagnosis of *Vipera*-bites can still occur in Hungary. Our case highlights the possibility to enhance biogeographic data on certain species by using reports from different scientific fields such as clinical toxicology and emergency medicine. Therefore, especially when the geographic distribution of venomous snakes is surveyed, the analysis of available clinical records is highly encouraged. The knowledge of distribution of a taxon can be one of the key elements of the exact diagnosis of snakebites. The origin of the snake(s) is to be surveyed in the near future.

Acknowledgement. We thank to Dr Zsuzsanna Károlyi (Miskolc Semmelweis Ignác Health Centre and Hospital, Dermatology Ward, Miskolc, Hungary) for providing the photographs, and the comments of two anonymous reviewers. The authors thank to Tibor Somlai (National Park of Hortobágy, Szabolcs-Szatmár-Bereg Conservation Area, East Hungary) for providing some valuable information, regarding adder populations.

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