Comment on: Kalra B, Kalra S, Chatley G, Singh H (2006) Rat bite as a cause of diabetic foot ulcer—a series of eight cases. *Diabetologia* 49:1452–1453

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To the Editor:

We read with interest the report by Kalra et al. describing rat bites in rural patients presenting to their hospital in India [1]. Although we welcome their highlighting the role of rat bites as an important cause of diabetic foot ulcers in less developed countries, and their addition to the sparse body of literature on the subject, we have some concerns regarding their report.

First, the authors did not carry out a relevant, comprehensive literature search—an indispensable prerequisite for writing on any topic. Indeed, a thorough review of the literature would have identified our series of 34 diabetic patients in Tanzania, who developed foot ulcers through rat bites [2]. Our paper was published in 2005 and remains the largest published series to date. In addition, there have been two previous reports from India and one from the West Indies in which rat bites were recognised as the underlying precipitators of diabetic foot ulcers [3–5]. In all these reports, high rat populations, poor housing, and crowding were identified as the major underlying risk factors for rat bite injuries among diabetic patients. However, none of these reports, including our series, were cited by Kalra et al.

The 34 patients in our series all had peripheral neuropathy and, similar to the eight patients described by Kalra et al., peripheral vascular disease was not an underlying risk factor. In addition, patients in our series had rat bite-associated foot ulcers of varying degrees of severity, which dictated how they were managed. For example, for rat bite ulcers that were complicated by localised infection, we prescribed oral flucloxacillin, ampicillin and metronidazole; patients with severely infected ulcers or who had progressed to systemic infection required intravenous therapy with third-generation cephalosporins and adjunct surgery. In fact, adjunct amputation was required for 17 of our patients, four of them major and 13 minor. Thus, the statement by Kalra et al. that ‘treatment is fairly simple and does not require third-generation antibiotics’ is misleading and ignores the fact that affected patients could easily develop progressive infection.

Four of the patients in our series died from overwhelming sepsis after developing synergistic gangrene of the affected limb [6]; all four had been treated with intravenous antimicrobials and undergone surgical debridement and amputation. We found that diabetic patients who delayed seeking medical attention after recognising a rat bite injury to the foot were significantly more likely to develop gangrene than those who did not delay. In fact, all four deaths described above were of patients who had delayed seeking medical attention for more than 1 week after recognising the injury. Of note, we found that patients with cataracts were more likely to delay seeing a doctor than patients without cataracts—a reflection of the fact that patients with reduced visual acuity and severe peripheral neuropathy are less likely to be aware that they have sustained a rat bite injury.

We do not agree with Kalra et al. that rat bites are especially restricted to patients from rural areas. The

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majority of the 34 patients in our series were from middle socioeconomic backgrounds, lived in urban areas, and all slept in beds. We were also disappointed that the authors did not suggest better preventive measures—we do not believe that pest control will solve the problem, especially in resource-poor urban areas, where rodent populations are overwhelming. Moreover, in less-developed settings characterised by crowding and numerous children running around, anti-rodent poisons are not the kind of agents one would want to leave around the house. Mosquito nets have been recommended for preventing rat bites [4], although in our series, some of the patients who had been using nets still suffered bites after the rodents gnawed through the netting.

Certainly, in an ideal world, preventive measures aimed at eliminating or reducing the factors that attract rats would include improved housing, garbage collection and disposal, better food storage, and enhancement of domestic hygiene through access to potable water. Unfortunately, in many parts of the world, such basics remain unavailable or inaccessible. On a patient level, however, there are some feasible preventive measures: mosquito nets should be used if available. Although no data have been published on whether protective covering on the feet of diabetic patients living in housing with high rat populations might help

prevent rat bites, patients with a history of previous or recurrent rat bites could consider wearing soft protective booties when going to bed. At-risk patients should examine their feet on waking up in the morning; those with compromised eyesight should have their feet examined by family members or friends. Finally, patients who suspect they might have sustained a rat bite injury to the foot should seek immediate medical attention and avoid any unnecessary delays.

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