Commentary

The vampire in medical perspective: myth or malady?

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Introduction

The vampire is a fascinating creature that has captured man’s imagination ever since its first descriptions. Throughout the years and all over the world it has been portrayed in various—sometimes conflicting, but more often relatively similar—ways in folklore, books and movies. Some well-known examples are the Transylvanian count Dracula, the sasabonsam from West African folklore and the manananggal from the Philippines. The aversion to garlic and sunlight and a victim’s similar fate after a bite seem to be recurring elements.1,2 On closer inspection the physical and behavioral features of the vampire show striking and intriguing similarities with three relatively rare medical conditions discussed in this article: porphyria, rabies and pellagra.

Porphyria

The association between vampirism and porphyria is probably the most famous one. Porphyria refers to a group of disorders characterized by a defect in one of the enzymes involved in the synthesis of heme. As a consequence, accumulation of porphyrins (toxic heme precursors) occurs in various organs, depending on the specific subtype.3 Although porphyria cutanea tarda and acute intermittent porphyria are the most common forms, it is congenital erythropoietic porphyria that is in particular associated with vampirism.1 This autosomal recessive disorder, also known as Günther’s disease, is characterized by pronounced photosensitivity and chronic hemolytic anemia.3

The classical aversion of the vampire to garlic may be accounted for by the ability of certain compounds of this bulbous plant to induce the heme degrading enzyme heme oxygenase-1,4 thereby further exacerbating the anemia. Furthermore, in the presence of sunlight accumulated uroporphyrin I and coproporphyrin I are able to donate electrons to oxygen, resulting in the formation of reactive oxygen species and severe skin damage.5 In addition, secondary infections and bone resorption may induce severe scarring and deformities of sun-exposed body parts. Accumulation of toxic porphyrins not only occurs in skin, but also in bones and teeth,6 giving rise to the characteristic erythrodontia that may have readily been attributed to the drinking of blood in former days. In this way, vampires might theoretically replenish their heme stores and thus partially correct the state of chronic anemia. Further analysis, however, reveals the fraction of heme in the circulation after oral intake to be negligible and craving to be absent among porphyria patients.1

Rabies

The association between vampirism and rabies was first described in 1733.6 Three years after, the French theologian Augustin Calmet wrote that people who died from rabies had an increased chance of ‘returning’ (as a vampire).7 Rabies is caused by a lyssavirus that is transmitted through animal saliva—usually after a bite of the with vampires associated bat, wolf or dog—and quickly travels along the peripheral nervous system by retrograde axonal transport. After a phase with non-specific, prodromal symptoms, such as fatigue and periwound paresthesias, an encephalitic or (less frequently) paralytic illness develops. The encephalitic or ‘furious’ form is clinically characterized by hydrophobia, muscle spasms, agitation, insomnia and bizarre—beastly or hypersexual—behavior.8

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There are several links between hydrophobia and vampires. Streaming water is one of the apotropaia or repellent substances and, according to folklore, the chance of transforming into a vampire could be decreased by sprinkling water on the coffin of the deceased. Hydrophobia is characterized by severe laryngeal muscle spasms in response to drinking or even seeing water, often accompanied by coughing up blood and exposing the teeth. Even one’s own reflection could trigger laryngeal spasms, which might explain the vampire’s fear of mirrors. The beastly biting behavior of the infected patient, a means to transmit the virus, could explain how vampirism was transmitted from one person to another. Both this behavior and the insomnia which could explain the vampire’s nightly escapades, are the result of dysregulation of the limbic system, an important and early site of neuronal damage and inflammation in furious rabies.

Finally, as opposed to the rare forms of porphyria, rabies was a relatively common condition in former times.

Pellagra

A deficiency of niacin and its precursor molecule, the essential amino acid tryptophan, gives rise to the so-called four D’s of pellagra: dermatitis, diarrhea, dementia and, unless proper treatment is initiated, death. Photosensitivity is a hallmark of this disorder that is dermatologically characterized by erythema, edema—and in long-established disease—hyperkeratosis and hyperpigmentation, most notably of the neck (‘Casal’s necklace’) and dorsal surfaces of the hand. Furthermore, erythematous glossitis is often present and it is not hard to imagine the link between this symptom and fangs, dripping with blood. Insomnia and aggression could provide an explanation for the behavior of the vampire. Lastly, due to scarce resources in former days, nutrient deficiency would seem an epidemiologically plausible explanation for the vampire myth.

Conclusion

In the previous sections, we have described similarities between three relatively rare medical conditions and the characteristics of vampires, as they are described in folklore and the more contemporary books and movies. Although porphyria, rabies and pellagra each provide some sort of medical justification for the vampire myth, none of these diseases seems to present a conclusive explanation for the sum of properties and phenomena. Furthermore, it seems likely that some of the vampire’s features that were observed in a corpse after opening the coffin can simply be accounted for by the normal decomposition process of the human body. For instance, fresh blood around the mouth and a dis tended—‘satiated’—abdomen are often noted in the deceased as a result of increased pressure due to intestinal gas accumulation.

Should we therefore conclude that a disease is an insufficient explanation for the vampire myth? Not necessarily. As mentioned earlier, various creatures with similar appearance, abilities and behavior have been described independently by different peoples all over the world. Although this might be sheer coincidence, these similarities in depiction may point to a common ‘source of inspiration’ which could very well be a medical condition that is seen all around the world. Most likely, other influences, such as indigenous animals or local beliefs and traditions, may have colored the portrayals of the vampire from region to region. In summary, although it would not be justified to conclude that the vampire myth definitely has medical roots, there certainly are arguments that at least partially favor this hypothesis.

Conflict of interest: None declared.

References