

The Potential Danger of Monkey Pox Virus.

Galina and Sergei Shechelkunov in their review of orthopoxvirus infections have described the world-wide spread of monkey pox and the danger this has presented as a result of a possible emergence of new forms of smallpox.¹ They have concluded that ‘an increasing number of human infections with zoonotic orthopoxviruses and, first of all, monkeypox, force us to reconsider a possible re-emergence of smallpox or a similar disease as a result of natural evolution of these viruses.’²

They go on to add that ‘human monkeypox is of particular concern. In conditions of a long absence of vaccination of the population and a much more frequent infection in people, MPXV [monkeypox] can acquire not only high transmissibility but also high pathogenicity, which is characteristic of VARV [smallpox], as a result of natural evolution.’³

There is reason to believe that a similar process of evolution occurred historically with an increase in the virulence of smallpox. Additionally, there is other historical evidence that monkeypox, cowpox and smallpox were sometimes very closely related. At the end of the nineteenth century the microbiologist, S.M. Copeman, explored the relationship between smallpox and cowpox experimentally:

He first inoculated a monkey with smallpox virus and then inoculated a calf from such an infected monkey. This resulted in typical vaccine, from which good strains of vaccine lymph were obtained. On the basis of this experience, Copeman suggested that cowpox may have actually originated in the eighteenth century from inoculated smallpox, as the local sore produces by the inoculation incision frequently was very itchy, and milkers who scratched their arms may easily have conveyed infectious matter to the cow’s udder.⁴

Copeman gave further details of his experiments in the *Proceedings of the Royal Society of London* as follows:

I next turned to the monkey tribe on account of their similarity in many respects to man ...the inoculation of vaccine and of variolous lymph having each of them in my hands, successful results in every instance in which I have tried it on the monkey.⁵

Other authorities have also linked monkeypox with smallpox: ‘previously the MPX [monkeypox] was reported to be like smallpox infection with less fatality. However, over time, the MPX virus became more pathogenic and caused an outbreak with lots of unanswered

¹ Galina and Sergei Shechelkunov, ‘Smallpox, Monkeypox and Other Orthopoxvirus Infections’, MDPI AG.

² Ibid.

³ Ibid.

⁴ P. E Razzell, ‘Edward Jenner: The history of a medical myth’, *Medical History*, 1965, p. 222.

⁵ *Proceedings of the Royal Society of London*, Abstract, 1894.

questions.⁶ This implies that monkeypox and smallpox are very closely related, although genetic analysis shows that they are distinct viruses,⁷

Historically, smallpox has also been confused with cowpox, and there were many successful attempts to convert the former into the latter, mainly for the purposes of the production of vaccine.⁸ However, many of the developments are controversial, and genetic analysis of the three viruses – smallpox, cowpox and vaccinia – have shown them to be genetically distinct.⁹ Nevertheless there is good evidence that the early smallpox vaccines, including that promoted by Jenner, were forms of attenuated smallpox.¹⁰ The source of Woodville’s ‘World Lymph’ was taken from the arm of a patient with over 300 pustules, and this was used by Jenner in his early practice.¹¹ Jenner himself acknowledged the variolous nature of this vaccine, by writing ‘I made some experiments myself with this matter, and saw a few pustules on my first patients, but in my subsequent inoculations [vaccinations] there were none.’¹²

The source of the Lister Institute’s stock of vaccine is believed to be from the arm of Prussian soldier suffering from smallpox in 1870,¹³ and there is now extensive evidence that much smallpox vaccine is derived from smallpox itself.¹⁴

This raises the question of the relationship between the smallpox, cowpox and vaccinia viruses, but as we have seen genetic analysis reveals all three viruses to be distinct. The solution to this conundrum probably relies on the evolution of all viruses, involving a rapid rate of mutations.¹⁵ For example, this would possibly explain how the COVID pandemic started in Wuhan market animals.¹⁶ This might account for how smallpox virulence increased markedly in England between the sixteenth and nineteenth centuries.

We saw earlier how monkeypox ‘became more pathogenic’ over time and this is mirrored in the history of smallpox infection. The following table depicts the increasing mortality rate of smallpox in London between the sixteenth and eighteenth century.¹⁷

⁶ Avsel Karagoz, Husevin Tombuloglu, Moneerah Alsaed, Guzin Tombuloglu, Abdullah A. AlRubaish, Amal Mahmoud, Samira Smallovic, Sabahudin Cordic, Ali A. Rabaan and Ebledam Alsuheim, Monkeypox [mpox] virus: Classification, origin, transmission, genome organization, antiviral drugs, and molecular diagnosis’, *Journal of Infectious Public Health*, 2023 [Online].

⁷ Ibid.

⁸ P.E. Razzell, *Edward Jenner’s Cowpox Vaccine: The History of a Medical Myth*. 1980, p. 98.

⁹ A. W. Downie, ‘Smallpox’, in S. Mudd, (ed.), *Infectious Agents and Host Reactions*, 1970.

¹⁰ See Razzell, *Edward Jenner’s Cowpox Vaccine*.

¹¹ Ibid, pp. 22-26.

¹² J. Barron, *Life of Dr Edward Jenner*, 1827, Volume 1, pp. 314,342.

¹³ J.A. Dudgeon, ‘Development of smallpox vaccine in England in the eighteenth and nineteenth centuries’, *British Medical Journal*, 1963, p. 1371.

¹⁴ Razzell, *Edward Jenner’s Cowpox Vaccine*, p. 98.

¹⁵ Karagoz et.al., ‘Monkey pox [mpox] virus’,.

¹⁶ S. Mallapaty, ‘COVID pandemic started in Wuhan market animals’, *Nature*, 20th September 2024.

¹⁷ These figures are taken from P.E. Razzell, *The Conquest of Smallpox*, 2003.p. 169; C. Creighton, *A History of Epidemics in Britain*, Volume 2, 1965, p. 531.

- **Table 1: Smallpox Deaths in the London Bills of Mortality**

<i>Period</i>	<i>Proportion Smallpox Burials</i>
1574-98	1.60%
1629-36	2.80%
1650-60	4.80%
1660-70	3.60%
1670-80	7.10%
1680-90	7.30%
1690-1700	4.50%
1700-10	5.30%
1710-20	8.10%
1720-30	8.20%
1730-40	8.50%
1740-50	7.30%
1751-60	9.60%

The increase in virulence during the middle of the seventeenth cent is reflected in contemporary comments. For example, Dr Tobias Whitaker, who had been exiled with Charles II during the civil war, wrote in 1661 that the smallpox

Was constantly and generally in the common place of petit and puerile and the cure of no moment... But from what present constitution of ague this childish disease hath received such pestilential tinctures I know not; yet I am sure that this disease, which for hundreds of years and before the practice of medicine, was so exquisite, hath been as commonly cured as it hapned.¹⁸

Other commentators writing in the 1660s noticed this increase in virulence.¹⁹ The increasing fatality of smallpox is revealed in the case fatality rate of the disease in the London Smallpox Hospital.

Table 2 ; Case Fatality Rate of Smallpox in the London Smallpox Hospital.²⁰

<i>Period</i>	<i>Number of Cases</i>	<i>Proportion That Died</i>
1746-63	6456	26%
1776-1800	7017	32%
1836-51	2654	38%

This table covers the period between the middle of the eighteen and nineteenth centuries, and Lettsom writing in 1795 stated:

¹⁸ Creighton, *A History*, Volume 2, p. 436.

¹⁹ G. Miller, *The Adoption of Inoculation for Smallpox in England and France*. 1957. p. 30.

²⁰ *Royal Commission on Vaccination*, 1st Report, 1889, p.74; 3rd Report, 1890, p. 100; 6th Report, 1896, p.717; *The Lancet*, Volume 9, 1826, pp 670, 671.

I think from my own experience, that the malignity [of smallpox] even in London is augmenting. When I practised here, 35 years ago, one in ten was the calculation; but I think one in six is now a fair proportion.²¹

There is evidence that the disease continued to increase in virulence throughout the nineteenth century:

Table 3: Case Fatality Amongst the Unvaccinated in Smallpox Epidemics 1781-1893.²²

<i>Location of the Epidemic</i>	<i>Date</i>	<i>Cases</i>	<i>Deaths</i>	<i>Per Cent Fatality</i>
Leeds	1781	462	130	28%
Huddersfield	1783	458	103	22.5%
Norwich	1819	200	46	23%
Sheffield	1887-88	552	274	49.5%
Dewsbury	1891-92	366	92	25%
Warrington	1892-93	68	24	35.5%
Leicester	1892-93	158	19	12%
London	1892-93	409	199	48.5%
Gloucester	1892-93	768	314	41%

McVail concluded that ‘natural smallpox gradually became throughout the eighteenth century, and up to the epidemic of 1870-73, a more virulent and fatal disease, its maximum fatality being on a large basis of facts 45 per cent.’²³

It was only the practice of variolation and vaccination that prevented England from being devastated, similar to what occurred in the fourteenth century as a result of the bubonic plague. Fortunately, it appears smallpox vaccine is effective in preventing monkeypox,²⁴ although this may require the development of a vaccine designed specifically for monkeypox. This may also require similar measures conducted in England in the nineteenth century, including the introduction of compulsory vaccination in 1840.²⁵

Although hypothetical, the risks of a development of a major monkeypox epidemic are sufficiently serious to require preventive action. As we saw earlier the fatality of monkey pox is increasing with a case fatality rate of up to ten per cent.²⁶ If like smallpox, in its spread and fatality continues to increase, it will be necessary to take major preventative action.

²¹ T.J. Pettigrew, *Memoirs of the Life and Writings of the Late John Oakley Lettsom*, 2, 1817, pp. 121, 122.

²² Razzell, *The Conquest*, p. 177.

²³ J.C. McVail, *Half a Century of Smallpox and Vaccination*, 1919, p. 19.

²⁴ Karagoz et.al., ‘Monkey pox [mpox] virus’.

²⁵ Creighton, *A History*, Volume 2, p.610.

²⁶ Karagoz et.al., ‘Monkeypox [mpox] virus’.

