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The essence of medical practice

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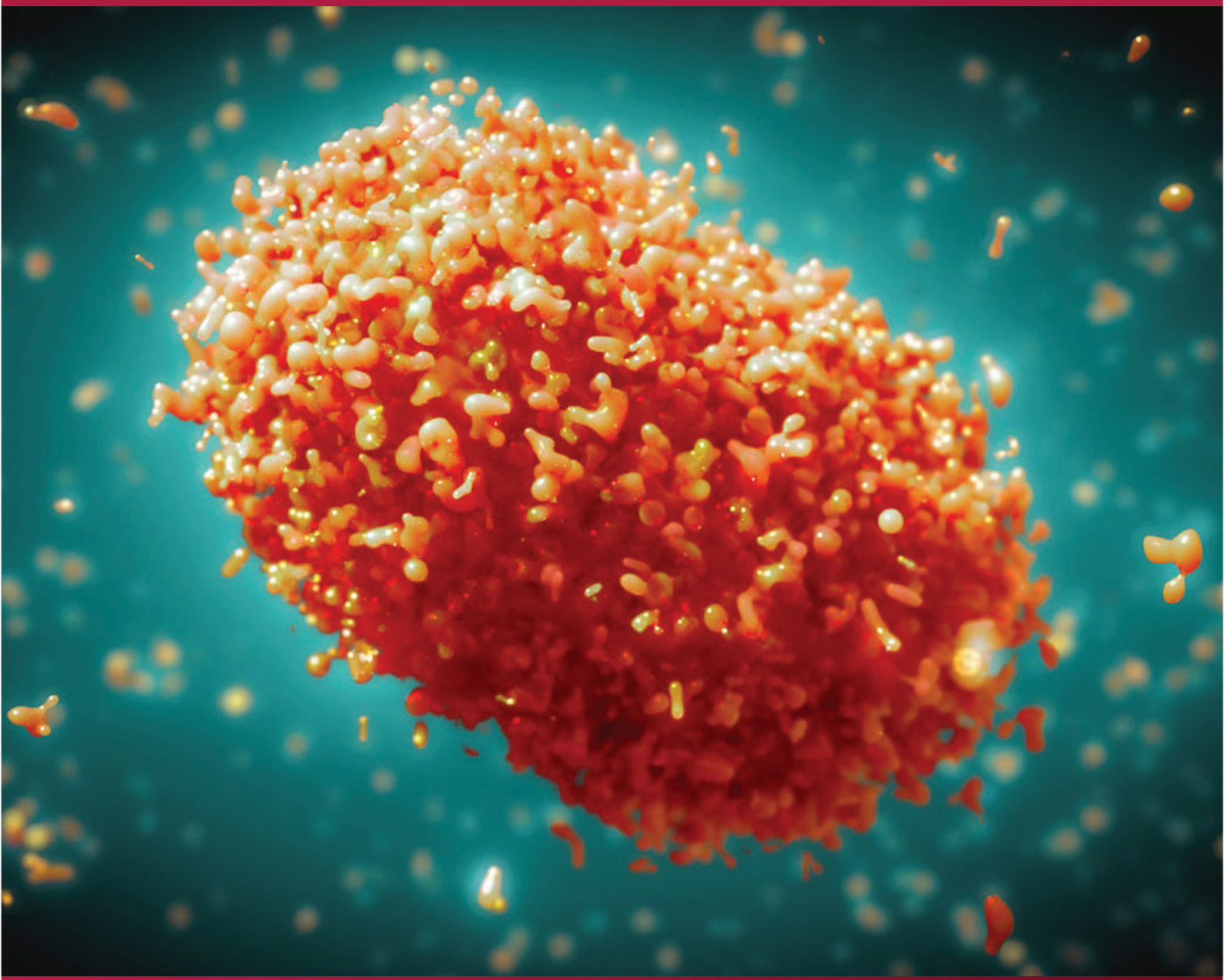

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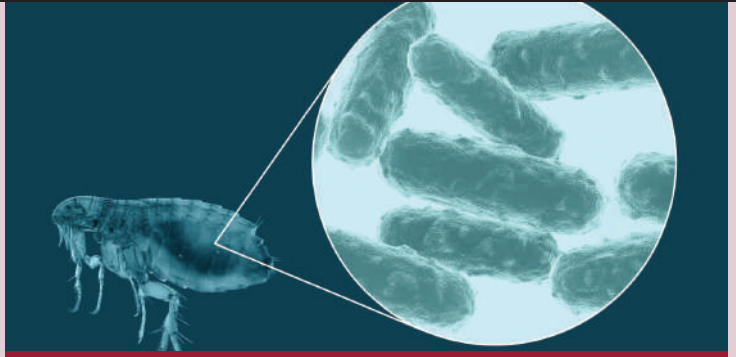


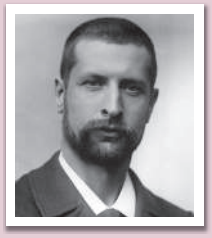
DISEASE HISTORY

Plague

Plague is an infectious disease caused by *Yersinia pestis*. It is a bacterium transmitted from rodents to humans by the bite of infected fleas. Plague was the cause of some of the most devastating epidemics in history. It was the disease behind the Black Death of the 14th century, when as much as one-third of Europe's population died. Huge pandemics also arose in Asia in the late 19th and early 20th centuries, eventually spreading around the world and causing millions of deaths.

Plague is an ancient disease that was described during classical times as occurring in North Africa and the Middle East. Unequivocal evidence for its early existence comes from the discovery of genomic traces of *Yersinia pestis*. pestis in the teeth of Neolithic farmers in Sweden dated to roughly 4,900 years ago and from analyses of ancient DNA in the teeth of bronze age humans, which indicate that *Y. pestis* was present in Asia and Europe by between 3000 and 800 BCE. It is impossible, however, to verify the true nature of these early outbreaks.

The first great plague pandemic to be reliably reported occurred during the reign of the Byzantine emperor Justinian I in the 6th century CE. According to the historian Procopius and others, the outbreak began in Egypt and moved along maritime trade routes, striking Constantinople in 542. There it killed residents by the tens of thousands, the dead falling so quickly that authorities had trouble disposing of them. Judging by descriptions of the symptoms and mode of transmission of the disease, it is likely that all forms of plague were present. Over the next half-century, the pandemic spread westward to port cities of the Mediterranean and eastward into Persia. Plague was first discovered by a team of scientists during an outbreak in Hong Kong in 1894. Two bacteriologists, Alexandre Yersin and Kitasato Shibasaburō, independently isolated the bacterium but it was Yersin whose work was more widely recognized and the bacterium (*Yersinia pestis*) was eventually named after him.



Alexandre Emile Jean Yersin
(September 22, 1863 - March 1, 1943)

Baron Kitasato Shibasaburō
(January 29, 1853 - June 13, 1931)

Reference: www.britannica.com

The use of wearable technology for health monitoring

The journey of health wearables has been transformative. From simple devices for tracking physical activity to advanced medical tech that monitors vital signs, sleep patterns and more, this evolution has been instrumental in improving health outcomes and promoting preventive healthcare.

Wearable healthcare technology has etched an indispensable role in contemporary healthcare. Here's why:

- Continuous monitoring: These devices offer real-time tracking of vital signs, providing valuable health information.
- Empowering individuals: With wearables, individuals can take control of their health making informed decisions about their lifestyle and medical care.
- Data-driven decisions: For healthcare providers, this real time data can significantly improve the health of their patients by enabling data-driven decision-making.
- Specific applications: For instance, wearables equipped with electrocardiograph (EKG) sensors can monitor a patient's heart activity by sensing multiple physiological signals.

Fitness trackers: Beyond steps counting

Fitness trackers are no longer just for counting steps, these healthcare trackers now measure everything from heart rate to sleep quality with advanced sensors.

Smart watches and bands: Your health companion

The smart watch and other smart health bands have revolutionized wearable technology. They not only track physical activity but also monitor vital signs and even detect irregular heart rhythms and sync it with smartphones.

Biosensors and implants: The invisible health protectors

Biosensors and implants are the best medical wearables for continuous and invasive monitoring. These devices can monitor a range of health parameters, including glucose levels in diabetes patients or cardiac function in heart disease patients in real time.

Hospital wearables: Revolutionizing in-patient care

From smart patches that monitor temperature to wristbands that keep track of heart rate and oxygen levels, these health gadgets are set to transform in-patient care.

The future of wearable technology in healthcare is not just about new devices; it's also about harnessing the power of big data and AI to provide personalized, preventive healthcare. It's about empowering patients to take control of their health and fitness, making healthcare more accessible and efficient than ever before. As we look ahead, one thing is clear: The future of healthcare is wearable and it's closer than we think.

Reference : 1. www.ncbi.nlm.nih.gov
2. topflightapps.com

REVIEW ARTICLE

Mpox – A global threat

Introduction

The mpox (monkeypox) virus was first isolated and identified in 1959 when monkeys shipped from Singapore to a Denmark research facility fell ill. However, the first confirmed human case was in 1970 when the virus was isolated from a child in the Democratic Republic of Congo suspected to have smallpox.

Coincident immunity to the mpox virus was previously achieved with vaccinia vaccination; however, eradicating smallpox and subsequent lack of vaccination efforts paved the way for mpox to gain clinical relevance. Furthermore, because most cases of mpox occur in rural Africa, suspected underreporting may translate to an underestimation of the potential threat of this pathogen.

Etiology

Mpox belongs to the family: Poxviridae, subfamily: chordopoxvirinae, genus: orthopoxvirus and species: mpox virus. On electron microscopy, the mpox virus is relatively large (200 to 250 nanometers). Poxviruses are brick-shaped, surrounded by a lipoprotein envelope with a linear double-stranded DNA genome. Aside from their reliance on host ribosomes for mRNA translation, poxviruses include all necessary replication, transcription, assembly and egress proteins in their genome.

Mpox is a zoonosis and is spread from animals to humans. The animal reservoir for the disease is thought to include squirrels, rats, monkeys, primates, prairie dogs, hedgehogs, pigs and mice found in the african regions from where mpox was previously widely reported. The ongoing epidemic is, however, primarily driven by human-to-human transmission through respiratory droplets, fomites and direct contact with lesions of an infected individual. Recent analysis has found that viral loads are high in bodily fluids, including urine, saliva, semen and feces, as well as in swabs taken from the oropharynx and rectum, suggesting that sexual transmission is a major driver of transmission.

Epidemiology

Mpox was a zoonotic disease endemic to central and western Africa and most concentrated in the Democratic Republic of Congo. Although first identified in captive monkeys (hence the name), the available data suggests African rodents as the natural reservoir. Infections have occurred in squirrels, rats, mice, monkeys, prairie dogs and humans. Currently, two genetically distinct clades have been identified. The Congo

Basin (Central African) clade is reported more frequently than the West African clade and has documented cases of human-to-human transmission, whereas the West African clade does not.

Sporadic clusters and cases of human mpox have occurred outside of Africa. In 2003, Gambian giant rats imported from Ghana infected co-habitant prairie dogs sold as household pets in the Midwestern United States. This resulted in fifty-three human cases of mpox. In October 2018, one case occurred in a man who traveled from Nigeria to Israel. In May 2019, one case occurred in a man who traveled from Nigeria to Singapore.

In May 2021, a family returned to the United Kingdom after traveling to Nigeria and three family members became infected with the mpox virus. The sequential timing of symptom development in each case within the family (day 0, day 19, day 33) could represent human-to-human transmission. In July 2021, one case occurred in a man who traveled from Nigeria to Texas. In November 2021, one case occurred in a man who traveled from Nigeria to Maryland. As of May 2022, one case of human mpox in a man who returned to Massachusetts from Canada is under investigation, as well as clusters of human mpox in the United Kingdom.

Precise prevalence and incidence are difficult to establish, given suspected shortcomings in disease reporting and confirmation. However, both metrics have increased since the discontinuation of routine smallpox vaccination. Demonstrated risk factors for mpox infection are living in heavily forested and rural areas of central and western Africa, handling and preparing bushmeat, caregiving to someone infected with the mpox virus and not being vaccinated against smallpox. Male gender has also been correlated with infection risk. However, this may be confounded by the cultural norm that men frequently hunt and contact wild animals.

In 2022, there is now an ongoing mpox outbreak involving multiple countries on different continents, predominantly in the men who have sex with men (MSM) population, with a presentation involving predominantly genital lesions. In a cohort of 595 confirmed cases of Mpox in Spain in 2022, 99% of cases were found to be in the MSM population, with the lesions predominantly affecting the genital, perineal or perianal areas. The study also identified inguinal lymphadenopathy as a predominant feature suggesting that sexual transmission was the main mode of transmission. Germany reported 1304 confirmed cases as of 6th July 2022, again mainly in the MSM population. Sequencing data from various countries suggests that the 2022 epidemic is caused by the West African clade of the mpox virus. However, emerging data suggest that the present outbreak may have a newly emerging clade.

Transmission can occur through contact with bodily fluids, skin lesions or respiratory droplets of infected animals directly or indirectly via contaminated fomites. Although human-to-human transmission has previously been limited, mathematical modeling in the context of decreasing herd immunity to orthopoxviruses reflects an increasing threat of disease spread between humans. The Centers for Disease Control and Prevention (CDC) recommends isolation in a negative pressure room and standard, contact and droplet precautions in the healthcare setting with escalation to airborne precautions if possible.

Pathophysiology

Following viral entry from any route (oropharynx, nasopharynx or intradermal), the mpox virus replicates at the inoculation site and then spreads to local lymph nodes. Next, an initial viremia leads to viral spread and the seeding of other organs. This represents the incubation period, typically lasting 7 to 14 days with an upper limit of 21 days.

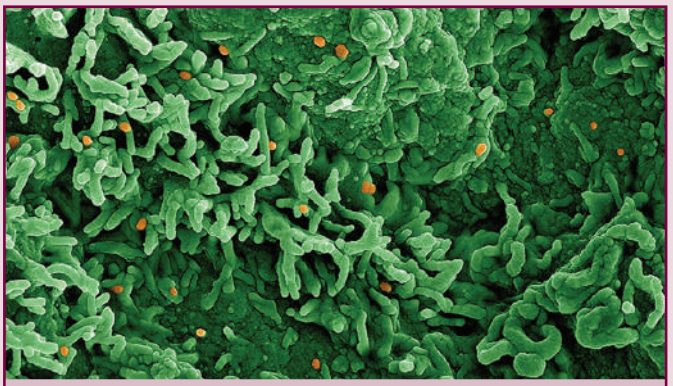


Figure. Colorized scanning electron micrograph of mpox virus (orange) on the surface of infected VERO E6 cells (green)

Symptom onset correlates with a secondary viremia leading to 1 to 2 days of prodromal symptoms such as fever and lymphadenopathy before lesions appear. Infected patients may be contagious at this time. Lesions start in the oropharynx and then appear on the skin. Serum antibodies are often detectable by the time lesions appear. Rash progression is described in more detail in the history and physical section.

History and physical

Historical clues for mpox infection, such as recent travel to endemic areas, interaction with wild animals imported from endemic areas and providing care to an infected animal or human, help build a differential diagnosis, but clinical features are critical.

Initial symptoms include fever, headache, myalgia, fatigue and lymphadenopathy, a key differentiating feature of mpox from smallpox. After 1 to 2 days, mucosal lesions develop in the mouth, closely followed by skin lesions of the face and extremities (including palms and soles) and are centrifugally concentrated. The rash may or may not spread to the rest of the body and the total number of lesions may vary from a small amount to thousands.

Over the following 2 to 4 weeks, the lesions evolve in 1 to 2-day increments through macular, papular, vesicular and pustular phases. Lesions change synchronously and are characterized as a firm, deep-seated and 2 to 10 mm in size. Lesions remain in the pustular phase for 5 to 7 days before crusts begin to form. Crusts form and desquamate over the subsequent 7 to 14 days and the condition resolves around 3 to 4 weeks after symptom onset in most cases. Patients are no longer considered infectious after all crusts fall off.

Different reports have suggested that the MSM population is at particular risk in the present outbreak. The pre - dominant clinical features include vesicular, umbilicated and pseudo-pustular lesions on the skin, fever, weakness, tiredness, headache and regional lymphadenopathy. The genital or perianal area is commonly involved and has lesion clustering, which is thought to be due to the sexual nature of transmission.

Evaluation

The CDC established case definition criteria for human mpox during the 2003 outbreak in the United States. However, the

Case definitions

Suspected case	Probable case	Confirmed case
A person of any age presenting with an unexplained acute rash and One or more of the following signs or symptoms: • Headache • Acute onset of fever (>38.5 ^{0}C) • Lymphadenopathy • Back pain • Myalgia • Asthenia and For which the following common causes of acute rash do not explain the clinical picture: varicella zoster, herpes zoster, measles, herpes simplex, dengue, bacterial skin infections and any other relevant common causes of papular or vesicular rash. Note: It is not necessary to obtain negative laboratory results for listed common causes of rash illness in order to classify a case as suspected.	A person meeting the case definition for a suspected case and One or more of the following: • Has an epidemiological link to a probable or confirmed case of mpox in the 21 days before symptom onset • Reported travel history to a mpox endemic country in the 21 days before symptom onset • Is hospitalized due to the illness	A case meeting the definition of either a suspected or probable case and Laboratory confirmed for mpox virus by detection of unique sequences of viral DNA either by real-time polymerase chain reaction (PCR) and/or sequencing

same criteria are not necessarily as valuable in endemic areas. The specificity of the epidemiological criteria decreases as the potential exposure of the population to infected mammals or humans increases. In addition, the specificity of the clinical criteria decreases as the prevalence of similar illnesses increases, as is the case with chickenpox, given the lack of routine varicella-zoster vaccination in Africa. Although clinical and epidemiologic criteria remain under review and may differ by situation and geographic location, confirmation of human mpox infection requires laboratory evidence.

Considering the similarities between human mpox infection and smallpox, the "Acute, Generalized Vesicular or Pustular Rash Illness Protocol" created by the CDC with the addition of lymphadenopathy to requisite primary criteria could be used to determine which patients warrant further testing. The CDC recommends the collection of two specimens, each from multiple lesions from different locations. The testing algorithm also includes non-variola Orthopoxvirus testing, with further characterization testing at CDC.

Mpox infection can be confirmed via isolation in viral culture or by PCR for mpox virus DNA from a patient specimen. Alternatively, tests indicating the presence of Orthopoxvirus in a patient specimen, barring patient exposure to another of the same genus, can be sufficiently diagnostic, such as visualization on electron microscopy, immunohistochemical staining for orthopoxvirus antigens, serum studies for anti-orthopoxvirus IgM (indicating recent exposure) and IgG (indicating prior exposure or vaccination).

Treatment

Currently, there are no specific clinically proven treatments for mpox infection. As with most viral illnesses, the treatment is supportive symptom management. There are, however, prevention measures that can help prevent an outbreak. The infected individual should remain in isolation, wear a surgical mask and keep lesions covered as much as reasonably possible until all lesion crusts have naturally fallen off and a new skin layer has formed. For severe cases, investigational use can be considered for compounds with demonstrated benefit against orthopoxviruses in animal studies and severe vaccinia vaccine complications.

The oral DNA polymerase inhibitor brincidofovir, oral intracellular viral release inhibitor tecovirimat and intravenous vaccinia immune globulin have unknown efficacy against the mpox virus. Dual therapy with tecovirimat and brincidofovir can be trialed in severe cases. Tecovirimat inhibits viral envelope protein VP37, thus blocking viral maturation as well as the release of the virus from infected cells. Brincidofovir is approved for the treatment of smallpox in the US. Normal saline and probenecid should be given concurrently with cidofovir. Vaccinia Immune Globulin (VIG) is licensed by the FDA to treat complications of vaccinia vaccination. The effectiveness of VIG against smallpox and mpox is uncertain and VIG has not been trialed in humans for smallpox or mpox.

For individuals exposed to the virus, temperature and symptoms should be monitored twice daily for 21 days because that is the accepted upper limit of the mpox incubation period. Infectiousness aligns with symptom onset; therefore, close contacts need not isolate while asymptomatic. In some cases, post-exposure vaccination with modified vaccinia, Ankara vaccine (smallpox and mpox vaccine, live, non-replicating) is recommended. Contact between broken skin or mucous membranes and an infected patient's body fluids, respiratory droplets or scabs is considered a "high risk" exposure and warrants post-exposure vaccination as soon as possible. According to the CDC, vaccination within four days of exposure may prevent disease onset and vaccination within 14 days may reduce disease severity.

The replication-defective modified vaccinia Ankara vaccine is a two-shot series, four weeks apart, with a superior safety profile compared to first and second-generation smallpox vaccines. Unlike live vaccinia virus preparations, administering modified vaccinia, Ankara does not create a skin lesion or pose a risk of local or disseminated spread. In addition, clinical trials have shown that modified vaccinia Ankara is safe and stimulates antibody production in patients with atopy and compromised immune systems, which are known contraindications to live vaccinia administration.

Identifying the potential benefits and drawbacks of preventative mpox vaccination in endemic communities requires more thorough data collection and feasibility analysis. Access to medical care, testing capabilities and infrastructure limits the ability to make informed decisions about best addressing this neglected tropical disease.

Self care and prevention

Most people with mpox will recover within 2-4 weeks. Things to do to help the symptoms and prevent transmitting mpox to others:

Do

- Contact your health care provider for advice;
- Stay at home and in your own, well-ventilated room if possible;
- Wash hands often with soap and water or hand sanitizer, especially before or after touching sores;
- Wear a mask and cover lesions when around other people until your rash heals;
- Keep skin dry and uncovered (unless in a room with someone else);
- Avoid touching items in shared spaces and disinfect shared spaces frequently;
- Use saltwater rinses for sores in the mouth;
- Take warm baths with baking soda or Epsom salts for body sores;
- Take over-the-counter medications for pain like paracetamol (acetaminophen) or ibuprofen.

Do not

- Pop blisters or scratch sores, which can slow healing, spread the rash to other parts of the body and cause sores to become infected or
- Shave areas with sores until scabs have healed and you have new skin underneath (this can spread the rash to other parts of the body).

To prevent spread of mpox to others, people with mpox should isolate at home following guidance from their health care provider or in hospital if needed, for the duration of the infectious period (from onset of symptoms until lesions have healed and scabs fall off). Covering lesions and wearing a well-fitting mask when in the presence of others may help prevent spread. Using condoms during sex will help reduce the risk of getting mpox but will not prevent spread from skin-to-skin or mouth-to-skin contact. If having sex, use condoms as a precaution for 12 weeks (about 3 months) after you have recovered.

Taking a break from sexual activity with new partners during periods of increased transmission can reduce the risk of getting mpox. Those who have had contact with someone with mpox should monitor for signs and symptoms for 21 days (3 weeks) and take precautions such as avoiding sexual activity during this period.

Health workers should follow infection prevention and control measures to protect themselves while caring for patients with mpox by wearing appropriate personal protective equipment (PPE) (i.e., gloves, gown, eye protection and respirator) and adhering to protocol for safely swabbing lesions for diagnostic testing and handling sharp objects such as needles.

Differential diagnosis

- Smallpox
- Generalized vaccinia
- Disseminated zoster
- Chickenpox
- Eczema herpeticum
- Disseminated herpes simplex
- Syphilis
- Yaws
- Scabies
- Rickettsial pox
- Measles
- Bacterial skin infections
- Drug-associated eruption

Prognosis

There are two distinct clades of the mpox virus, with a third possible clade potentially being described in the present outbreak. The West African clade has a more favorable prognosis with a case fatality rate below 1%. On the other hand, the Central Basin clade (Central African clade) is more lethal, with a case fatality rate of up to 11% in unvaccinated children. Aside from potential scarring and discoloration of the skin, the remainder of patients typically fully recover within four weeks of symptom onset.

In a cohort of 1119 confirmed cases of mpox from the ongoing outbreak in Spain, Germany, Italy and the United Kingdom, there have been no reported deaths even though it included a subset of patients with HIV, suggesting that the circulating strain may be less virulent. However, the quality of medical care could also play a factor in this.

Complications

- Bacterial superinfection of skin
- Permanent skin scarring
- Hyperpigmentation or hypopigmentation
- Permanent corneal scarring (vision loss)
- Pneumonia
- Dehydration (vomiting, diarrhea, decreased oral intake due to painful oral lesions and insensible fluid loss from widespread skin disruption)
- Sepsis
- Encephalitis
- Death

Deterrence and patient education

Education of patients and healthcare workers in regions where the mpox virus is endemic is of the utmost importance. Local containment is the best defense against the worldwide spread. Historically, the mpox virus has a limited ability to spread between humans. Nonetheless, the waning population of people vaccinated against smallpox paves the way for an increased prevalence of human mpox, increasing viral mutation opportunities. Therefore, improving patient recognition of this disease, reporting fidelity and access to diagnostic capabilities are critical actions for collecting the data necessary to gain a deeper understanding of and strengthen defense against mpox.

Enhancing healthcare team outcomes

The spread of infectious diseases requires a susceptible population and opportunities for transmission. Individual and herd immunity to mpox, previously achieved through widespread vaccinia vaccination, has declined since the 1980s, increasing human susceptibility to outbreaks. In addition, interim sociopolitical and ecological changes in endemic regions likely increased human exposure to animal reservoirs.

Due to the range of mpox disease severity, an infected patient may present to the emergency department, urgent care or primary care setting. The ability of an interprofessional team of clinicians, nurses, virologists, veterinarians and public health experts to promptly identify mpox infection in humans and animals, implement protective measures and initiate public health reporting creates a bulwark against a devastating outbreak. Specialty infectious disease pharmacist consult may prove helpful in resolving the case and in addition to infectious disease expertise, can perform medication reconciliation and counsel patients on their medications. The interprofessional paradigm will help drive better patient outcomes.

Conclusion

The resurgence of mpox in global outbreaks highlights the evolving nature of this zoonotic disease, particularly in the context of waning smallpox immunity and increased human - to - human transmission. The ongoing epidemic underscores the need for vigilance, timely diagnosis and effective public health interventions, especially as the virus spreads within specific populations, such as the MSM community.

While the current strain appears less virulent, the potential for complications and the risk of severe outcomes in vulnerable individuals remain. The lack of specific antiviral treatments necessitates a focus on prevention through vaccination, isolation of cases and robust public health measures.

As the global community faces the challenge of mpox, a concerted effort involving healthcare professionals, public health experts and local communities is essential. This interprofessional approach will not only enhance patient outcomes but also strengthen our defenses against potential future outbreaks. By improving education, expanding access to vaccines and enhancing diagnostic capabilities, we can mitigate the impact of mpox and safeguard public health on a global scale.

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2. www.nih.org.pk
3. www.who.int

Role of probiotics in human health

Introduction

Human beings consume a significant number of pathogens every day, primarily bacteria. For several decades, probiotic microorganisms have been utilized in several diets due to their positive effects on human health. The Agriculture Organization of the United States and the World Health Organization defined probiotics in 2001 as bacteria that, when given to a host at adequate levels, improve their health. Regarding probiotics, Lactobacillus and Bifidobacterium are the two most frequently used genera. These bacteria are generally thought of as harmless due to their ability to survive in the body to cure and prevent diseases, unlike the usual pathogens. Numerous randomly selected clinical trials have shown that probiotic strains are safe and effective in providing users with their benefits. These benefits include the prevention of acute diarrhoea, Crohn's disease, cardiovascular and urogenital infections, cancer, lactose intolerance, cystic fibrosis, dental caries and oral diseases. Bacteria may also be beneficial in preventing tooth decay, treating periodontal disease and reducing oral malodor. Probiotics' beneficial role in preventing inflammatory disorders is an ever-expanding list.

How probiotics work in our body

There are various ways the probiotics can work inside our body: Interacting and stimulating the growth of the body's good commensal microbes and inhibiting the growth of pathogens inside the human body. They sometimes also increase the host's antigenic response time, which in turn increases the synthesis of antimicrobial compounds and can also block the site where the pathogen might bind. Furthermore, probiotics exhibit adherence and (at least temporary) colonization of the human body, increasing the duration of retention and leading to sustained probiotic function.

Probiotics and their benefits

Benefits of probiotics include a large variety of uses not just for a particular part but almost everywhere in our body. In the gastrointestinal tract, lies their well-known benefit of improving our digestion and reducing the amount of cholesterol. Their other uses involve the treatment of diarrhea and the prevention of inflammatory bowel diseases. Furthermore, the benefits will include preventing dental caries and strengthening our immune system, especially during allergic conditions. The constant growth of harmful microorganisms can also be inhibited by probiotics to an extent. Bifidobacterium creates glutamine, which preserves the integrity of the mucosa and improves the mucosal barrier's defenses. Many studies have proved that probiotics help deal with different kinds of diarrhea, such as travelers' diarrhea, antibiotic - induced diarrhea and rotavirus-related diarrhea in small children. Irritable bowel syndrome has a poorly

understood cause and hence treatment for such people is challenging. However, introduction to the Enterococcus strain PR88 as an oral probiotic showed clinical improvement in patients. Probiotics affect the immune system by stimulating the gastrointestinal lymphoid tissue's lymphoid cells. Probiotics' effect on atopic dermatitis has been studied in depth. The intensity of eczema and the number of different processes in the given population decreased with the consumption of living and heat-neutralized probiotic bacteria. Lactobacilli protects women from developing urinary tract infections (UTIs). Human probiotics reduce cholesterol. Probiotics cause direct digestion of lipids, which influences cholesterol production.

How probiotics affect oral health

The oral effects of probiotics are unknown. There is a slight reduction in gum disease with the use of probiotics. Substances made by lactic acid bacteria cause inflammation. Most studies show that probiotics can eliminate infections by outcompeting bacteria for bonding surfaces and nutrients. None of the reviewed research read by the author indicated the harmful effects of bacteriotherapy.

Probiotics role in human gut-associated microbiome diseases

Microbial dysbiosis is a term used to describe an imbalance in the structure and function of intestinal microorganisms. Antibiotic use, bacterial infections and changes in the diet all contribute to the problem, which has become more prevalent in the modern era. Irritable bowel syndrome (IBS), celiac disease and other intestinal illnesses are associated with a lack of useful bacteria in the gut. Beneficial probiotics in the gastrointestinal tract inhibit pathogenic microbes from trying to infiltrate and grow by competing for space and resources. Re-establishing healthy commensal microbes and trying to prevent infections in patients following antibiotic therapy is among the most vital uses of probiotics. They are usually used for curing antibiotic associated diarrhea (AAD), which occurs whenever the microbial community is disrupted. Carbapenem-resistant *Clostridioides difficile* (previously *Clostridium difficile*), a disease causing bacterium, is one of the major causes of AAD. Previous reviews and meta-analyses have shown that probiotics when used in conjunction with other treatments, can help avoid AAD in patients of any age group. Probiotics help stop diarrhea induced by *C. difficile* both in adults and children. Furthermore, a study on this topic has shown that *Lactobacillus rhamnosus* and *Saccharomyces boulardii* are seen to be highly effective in protecting AAD.

Chronic bowel disease (Inflammatory bowel disease)

Inflammatory bowel disease (IBD) is a chronic inflammatory condition that affects the digestive system. IBD includes Crohn's disease (CD), ulcerative colitis (UC) and indeterminate colitis (IC), which are distinguishable based on where the GI tract inflammation is located. IBD is assumed to be caused by an aberrant immune system response; while the exact etiology is still unclear, stress and an unbalanced diet are claimed to be the potential causes. According to some studies, IBD pathogenesis may account for the presence of gut pathogens. Furthermore, numerous investigations have demonstrated that the microbiome of IBD patients differs from that of healthy individuals. Additionally, it has been proposed that preserving the balance of the gut microbes may be crucial for preventing IBD. Probiotics have drawn a lot of attention recently as a potential treatment to alter the microbe's positive effects on IBD. Probiotics, for instance, have been utilized to treat ulcerative colitis and induce remission.

Crohn's disease (CD), an irritable bowel disorder that involves losing weight, constipation, temperature, lethargy and abdominal pain, affects the entire gastrointestinal tract (GIT). The onset of CD is influenced by several factors, including genetic, environmental and microbial, although the exact cause is still unknown. CD's symptoms can be treated with various medications, however, the disease has no known cure. Lower immune system function and intestinal inflammation can be treated with immunosuppressants and steroid medications. Similarly, probiotics may offer an additional technique to standard therapy. It has been proved that early therapy was preferable to postoperative probiotic feeding in CD patients.

Sources of probiotics

Live bacteria and yeasts are known as probiotics and they may be good for one's health. They can be found in some meals and supplements as well as in the human digestive system. Probiotic bacteria are beneficial. They are found all over the body, although most people only think of the stomach and intestines when they think of them. Fermented foods such as yogurts and kimchi are sources of probiotics. Additionally, probiotic supplements are also available.

Conclusions

Previous studies regarding the benefits of probiotics on the human intestinal microbiome have shown to have promising findings for the cure of gut-related disorders. Additionally, in recent years there has been an increase in the number of studies that investigate how microorganisms contribute to patients' intestinal illnesses. Although much more research that is hypothesis-driven is required, there is a possibility that probiotics could be utilized as therapeutic options or prevention measures for diseases that are related to the individual gut flora.

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External auditory canal metastasis revealing bronchogenic carcinoma: A case report

Introduction

Lung cancer is one of the deadliest cancers, representing a leading cause of cancer-related deaths in both men and women worldwide. The majority of lung cancers are diagnosed at an advanced stage, with over half of them being metastatic at the time of diagnosis. In the temporal bone, metastases are most commonly found in the petrous portion, internal auditory canal or mastoid process and in the EAC.

Malignant tumors of the EAC are more common in male patients aged 60 - 70 years. Anatomically, the temporal bone is not a barrier but a medium for tumor spread through the potential pathways, e.g., the bony canals and intraosseous vessels and nerves, the petrosquamous suture line, the fissures of Santorini, the foramen of Huschke, the stylomastoid foramen and so on. The most common histologic type of EAC malignancies is squamous cell carcinoma (SCC), which accounts for 80% of tumors within the temporal bone, followed by other tumors such as basal cell carcinoma, adenoid cystic carcinoma, adenocarcinoma and so on.

Because the symptoms of early tumors are nonspecific, diagnosis is usually delayed. Radiological imaging assessment of head and neck is essential for accurate tumor diagnosis and staging. CT and MRI are complementary imaging examinations for EAC malignancies. Nevertheless, the extent of tumor may be either overestimated or underestimated despite scanning using both CT and MRI. The most widely accepted system is the Pittsburgh staging system. Nevertheless, the Pittsburgh staging system is proposed for SCC in the EAC.

Case presentation

A 64-year-old man, a former smoker of 40 pack per years, presented with failed conservative treatment for persistent right otitis externa. The patient had a medical history of bladder urothelial carcinoma without any other comorbidities. The bladder carcinoma was diagnosed 12 years ago following the onset of hematuria and pollakiuria, which led the patient to seek medical attention. A cystoscopy with biopsies was performed and the histological examination confirmed a transitional cell carcinoma and the tumor was classified as cT2bN0M0. The patient had a bladder preservation protocol, which involved receiving four cycles of MVAC polychemotherapy (methotrexate, vinblastine, doxorubicin,

cisplatin), followed by radiotherapy, spread out over a 6-week period. The patient was consistently monitored for a period of 10 years, during which follow-up cystoscopies and urological computed tomography (CT) scans revealed no signs of tumor recurrence. However, he subsequently discontinued regular follow-up care.

The patient presented with right-sided ear pain, bloody ear discharge and a noticeable hearing loss that had been ongoing for 1 month. Initially diagnosed as otitis externa, the condition did not improve despite treatment with antibiotics. The patient denied experiencing any tinnitus or vertigo.

Upon otoscopic examination, a friable, polypoid mass with surface bleeding was observed, completely obstructing the right EAC. The rest of the ear, nose, and throat examination, including cranial nerves and nasoendoscopy, showed no remarkable findings.

A temporal bone CT scan revealed extensive soft tissue density mass totally obstructing the right EAC, extending into the hypotympanum of the middle ear. There was no evidence of ossicular chain disruption, but significant bony erosion of the tympanic bone was observed (Figure 1).

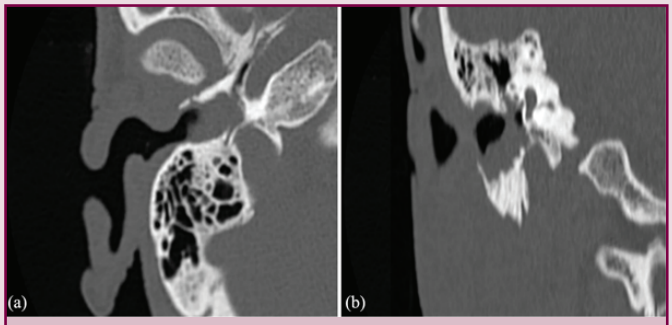

Figure 1. Axial (a) and coronal (b) views of computed tomography of petrous temporal bones showing an erosive mass of the right external auditory canal (EAC), extending into the middle ear with erosion of the anterior and inferior EAC walls.

An excisional biopsy was performed under general anesthesia. The histopathological examination showed carcinoma cells exhibiting nuclear atypia, separated by a fibrous and well-vascularized stroma. These findings were consistent with poorly differentiated adenocarcinoma. The bronchogenic origin of the tumor was established based on positive immunohistochemical (IHC) staining for cytokeratin 7 and Thyroid transcription factor - 1 (TTF1), while staining for p63 protein and Trans-acting T - cell - specific transcription factor GATA - 3 was negative. This ruled out a urothelial origin for this metastatic lesion (Figure 2).

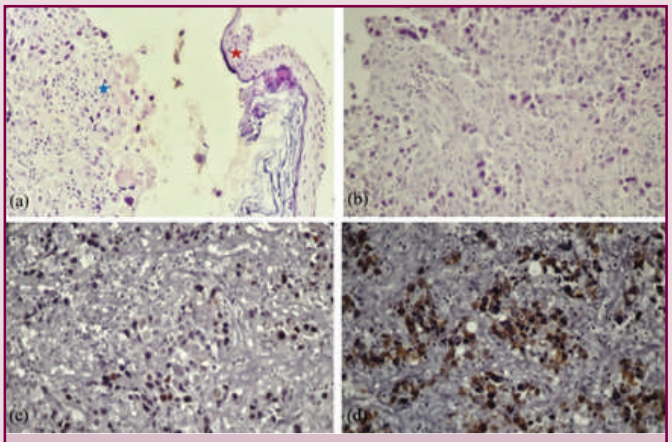

Figure 2. Histological findings: (a) and (b). Proliferation of clusters of cubocylindrical cells with densely atypical nuclei within a fibro-inflammatory stroma (blue asterisk). This proliferation elevates a surface squamous epithelium lining of the EAC (red asterisk) (HEx400). (c) Positive immunostaining for Thyroid transcription factor-1 (x400). (d) Positive immunostaining for cytokeratin 7 (x400)

An extension assessment was then conducted to investigate the primary tumor and identify any other distant metastases. A cervico-thoraco-abdomino-pelvic CT scan revealed a massive tumor mass in the apical and dorsal region of the right upper lobe of the lung, accompanied by carcinomatous lymphangitis in the dorsal segment. Additionally, a few centimeter-sized lymph nodes were observed in the right pulmonary hilar and peritracheal regions (Figure 3(a) and (b)). An enhanced brain CT scan exhibited a well-defined, homogeneous expansive process in direct contact with the left side of the cerebellar tent, suggestive of a secondary brain localization (Figure 3(c)).

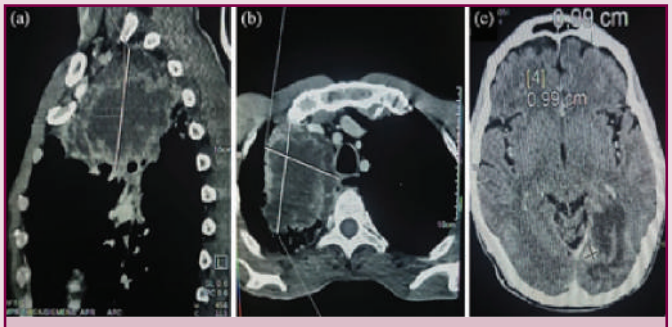

Figure 3. Sagittal (a) and axial (b) views of contrast-enhanced thoracic computed tomography (CT) revealing a massive tumor mass in the apicodorsal region of the right upper lobe of the lung. Axial (c) view of contrastenhanced cerebral CT revealing a well-defined, homogeneous process that avidly enhances, surrounded by a prelesional hypodensity zone, in direct contact with the left side of the cerebellar tent (red arrow).

A CT scan - guided biopsy of the primary lung tumor was performed. Histopathological examination concluded a widely necrotic, poorly differentiated mixed-type primary adenocarcinoma, which exhibited similar histopathological and IHC features to the metastasis in the EAC.

The tumor was staged as T4N2M1c. The patient received local external-beam radiation therapy for both EAC and cerebral metastatic lesions, with a total dose of 30 Gray administered over 10 fractions. Following radiation therapy, he received 4 cycles of chemotherapy consisting of cisplatin at a dose of 80 mg/m² on day 1 and day 22, as well as gemcitabine at a dose of 1250 mg/m² on day 1, day 8 and day 22. Unfortunately, the patient died due to deteriorating general condition.

Discussion

Primary cancer of the EAC and metastatic cancer to the EAC share similar clinical presentation. Commonly reported symptoms include hearing loss, otalgia, ear discharge, bleeding or the presence of a swelling in the EAC. However, none of these symptoms are specific to malignancy and can also occur in benign conditions such as EAC cholesteatoma or necrotizing external otitis. This similarity makes it challenging to clinically distinguish between benign and malignant conditions, leading to potential delays in diagnosis. However, a short duration of otologic symptoms and a history negative for previous inflammatory ear disease in adults between 50 and 60 years of age should raise suspicion for malignant diseases.

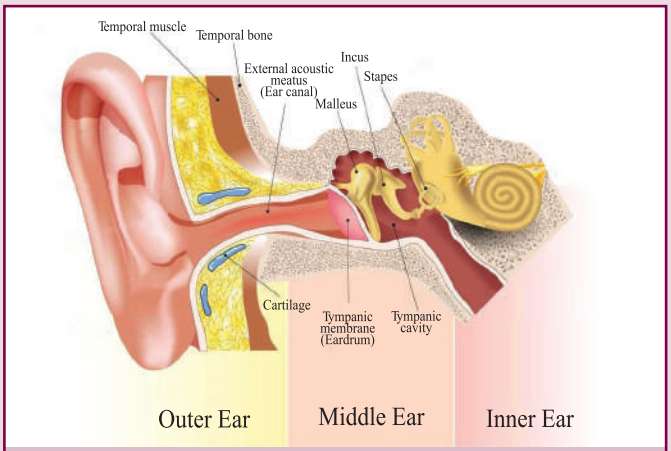

Figure. Anatomy of ear

In our case, the CT of the temporal bone revealed a complete obstruction of the EAC by a mass with soft tissue density extending into the middle ear, along with bone erosion of the tympanic bone. The diagnosis of malignancy was considered due to the large mass in the EAC, its extensive and irregular bone destruction of the EAC walls and its invasion of adjacent anatomical structures. Magnetic resonance imaging (MRI) of the temporal bone would be useful in cases of diagnostic uncertainty, particularly in differentiating an EAC cholesteatoma. However, neither CT nor MRI could differentiate between a primary or secondary tumor of the EAC.

The definitive and accurate diagnosis is made from findings of excisional biopsy. The combination of histopathological examination and IHC study is essential for distinguishing between a primary EAC cancer and a metastatic lesion and determining the primary tumor of the metastatic lesion. In our case, the positive immunostaining for cytokeratin and TTF1 strongly suggested a bronchogenic origin. The similarity of the IHC profile between the metastasis and the primary tumor provided evidence supporting a common origin for these two lesions.

The treatment approaches have been non-consensual and varied across different cases, taking into consideration factors such as the primary tumor site and histological type, tumor staging, overall patient health and comorbidities as well as the presence of other metastatic lesions. Treatment options included surgical resection, radiotherapy, chemotherapy, hormonal therapy or a combination of some of these approaches.

The available data on the prognosis and overall survival of patients with metastasis in the EAC are limited. However, it is widely recognized that lung cancer has a poor prognosis. The 5-year survival rate for lung cancer is approximately 15%, but this drastically drops to less than 1% in cases of metastatic tumors. A multidisciplinary approach is essential for improving the survival and quality of life of patients with metastatic lung cancer. Recent advancements in treatment modalities, particularly targeted biological drugs that target specific genetic mutations like epidermal growth factor receptor (EGFR), anaplastic lymphoma kinase and ROS1 proto-oncogene tyrosine kinase, have shown promise in enhancing outcomes. EGFR inhibitors, for instance, have demonstrated superior response rates and progression-free survival compared to standard chemotherapy. Unfortunately, access to these drugs and genetic mutation testing remains limited in our country.

References: 1. journals.sagepub.com
2. link.springer.com

World Osteoporosis Day
Say no to fragile bones

World Osteoporosis Day - WOD, marked on October 20 each year, is a year-long campaign dedicated to raising global awareness of the prevention, diagnosis and treatment of osteoporosis and related musculoskeletal diseases.

It aims to put bone health and fracture prevention on the global health agenda and reaches out to health-care professionals, the media, policy makers, patients, and the public at large. Osteoporosis literally means 'porous bone'. It is a condition where bones become thin and lose their strength as they become less dense and their quality is reduced. This can lead to broken bones, which cause pain and disability. Broken bones due to osteoporosis can be life-changing, with a serious impact on quality of life, mobility, and independence. Osteoporosis is often called the 'silent disease' because most people don't know they have the disorder until they break a bone after a minor fall or bump (known as a fragility fracture).

Worldwide, one in three women and one in five men aged 50 years and over will sustain a fragility fracture due to osteoporosis in their remaining lifetimes. The WOD campaign is an ideal occasion to drive action on behalf of bone health and fracture prevention.

References: 1. www.worldosteoporosisday.org
2. www.osteoporosis.foundation

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Info MEDICUS
The essence of medical practice

INFO QUIZ CARD

(BMDC registered doctors only)

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Read the questions, tick (√) the correct answers and hand over the Info Quiz Card attached to the Info Medicus to your nearest ACI representative by 31 December 2024.

1. **Which pandemic was one of the most significant pandemics caused by plague in 14th century?**
   (a) The Great Influenza (b) The Black Death
   (c) The Justinian Plague (d) The Asian Flu

2. **What is the incubation period for mpox?**
   (a) 2 - 4 days (b) 5 - 7 days (c) 7 - 14 days (d) 14 - 21 days

3. **Which probiotic strain is particularly effective for irritable bowel syndrome (IBS)?**
   (a) Escherichia coli (b) Enterococcus strain PR88
   (c) Streptococcus pneumoniae (d) Mycobacterium tuberculosis

4. **What is the primary treatment for external auditory canal metastasis?**
   (a) Radiation therapy (b)Antibiotics
   (c) Surgical resection (d) Topical steroid treatment

5. **Which diagnostic test is used to measure bone density in osteoporosis?**
   (a) X-ray (b) MRI (c) DEXA scan (d) Ultrasound