

# The Information and Treatment of Medical Solid Waste

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**Keywords:** Solid waste; Medical treatment; Environmental pollution; Treatment and recovery

**Abstract:** With the development of social economy, the improvement of medical treatment level provides a stable protection measure for our health. However, the medical treatment of solid waste disposal problems, but also increased. Medical solid waste refers to the medical and health institutions in the medical, prevention, health care and other related activities produced with a direct or indirect infection, toxicity and other hazardous solid waste. If medical solid waste mishandling, not only can cause the pollution of water, soil, air, can even lead to human and animal infectious disease outbreaks, and is likely to be the source of the epidemic. In the spring of 2003, in some areas of our country broke out caused by corona virus infectious atypical pneumonia SARS epidemic, to the people left a deep and painful lessons, and highlights China's relevant medical waste treatment and management of the technology does face a grim situation. [1]The report for the domestic and foreign medical solid waste treatment status of the investigation and analysis, hope to give the future of medical solid waste disposal put forward guidance.

## Preface

Medical solid waste, also known as medical waste, infectious waste. About 80% of medical solid waste and domestic waste is no different, but the rest of the harmful ingredients containing infectious bacteria, toxic substances and radioactive substances. [2] Medical solid wastes with a strong space infection, acute infections and latent infectious features such as, if not handled properly, not only can cause pollution to the water, soil, atmosphere, infectious disease outbreak of epidemic and can even lead to human and livestock, and is likely to be the source of epidemic diseases. Therefore, properly handle medical solid wastes have very strong social and economic and environmental benefits, not only reduce the pollution to the environment, and ensure the human health

## Production of Medical Solid Waste

Medical solid waste sources widely. To produce these wastes not only hospital, outpatient clinic, laboratory, blood bank, institutional care, the morgue, dental clinics and veterinary clinics. Medical solid wastes including generated from medical services in the hospitals, health centers and clinics clinical waste, surgical dressing residue, biological culture, animal test for residual, laboratory examination residue, infectious waste and wastewater treatment sludge.[3]

We can learn from the detection of medical solid waste samples of pathogenic bacteria in medical hazardous waste very much, the chemical toxicity to the environment and human survival is a threat. The above is just a part of the detection which found. There are some pathogenic bacteria, chemical toxicity of the test conditions are not tested, it is very harmful to the survival of human beings. Therefore, human beings need to have enough knowledge to deal with the disposal of hazardous waste.

## Classification of Medical Solid Waste

There are many solid waste classification method, according to its chemical properties can be divided into organic and inorganic wastes; According to the condition of the harm can be divided

into hazardous wastes and general waste; To facilitate the management, we usually classified according to its source, can be divided into mining solid waste, industrial solid waste, urban waste and agricultural waste and radioactive solid, Jane called mining waste, industrial waste, waste, agricultural waste and radioactive waste.

Table 1 Classification of medical solid waste [4]

| Classification              | Main material  |
|-----------------------------|--|
| Infectious waste            | Microbial cultures and infectious disease patient excreta, blood, waste samples for testing, infected animal experiments, bedding, suffers the pollution of cotton swabs and bandages, disposable pillow, dental appliances etc. |
| Anatomical waste            | Human organs and tissues, animal carcasses   |
| Sharp object                | Injection needle, disposable surgical knife, blade   |
| Chemical                    | Container for containing solution and disinfectant   |
| Pharmaceutical waste        | Expired, ineffective or contaminated drugs, vaccines or serum  |
| Waste with genetic toxicity | A drug that can cause mutations, abnormalities, and cancer, or other hazards.  |
| Radioactive waste           | Radioactive materials for use in containers and treatment of radioactive materials   |
| Heavy metal waste           | Damaged thermometer, other heavy metals such as mercury.   |

To produce these wastes not only hospital, outpatient clinic, laboratory, blood bank, institutional care, the morgue, dental clinics and veterinary clinic.

### Hazards of Medical Solid Waste

Medical solid waste is infectious, biological toxicity and strong corrosivity. Medical solid wastes contain a large number of bacteria and viruses, and in patients admitted to the hospital for examination, blood, urine, feces, and tissue biopsy waste produced, mixed infectious and pathogenic microorganisms; in the course of treatment, the items also may be contaminated with pathogenic microorganisms. Even non infectious diseases are often excluded waste detection of typhoid, Salmonella and other pathogens. If the medical solid waste mixed with garbage and piled up in the open air, bacteria and germs is easy to obtain breeding conditions, and multiply; not only to the urban landscape impact, failure ecological environment, also direct harm to human health. The country is listed as the national hazardous waste list in the first. [5]

In 955, a city in India after being pathogen contamination in the water, resulting in 68% of the population have icteric hepatitis A infection; outbreak of hepatitis A in Shanghai in 1986, is also due to the Jiangsu Province a hospital discharge with virus of sewage and waste with river caused by. Tianjin Hebei District Democratic Road refuse transfer station of four local hospital waste accumulation in 1994, the transfer station of two staff members from long term exposure to a large number of medical waste and infection, suffering from infectious diseases.

### Management Principles of Medical Solid Waste [6]

(1)With hospital beds, medical and health institutions to set up specialized medical waste storage warehouse; not inpatient beds of out-patient department, clinic etc. shall set up a specialized medical waste storage cabinet (box), and meet the requirements below:

1.Far away from the medical area, food processing areas, personnel activities and living

garbage storage sites, facilitate medical waste transport personnel and transport vehicles, vehicle access;

2. There are tight closure measures, set up (and) staff management, to prevent non staff access to medical waste;

3. There are rats, mosquitoes, anti-theft and anti-leakage and rain erosion protection measures;

4. Easy to clean and disinfect, the flushing waste water should be discharged into the sewage treatment system of the unit;

5. Avoid direct sunlight, should have good lighting equipment and ventilation conditions;

6. The warning signs of hazardous waste and medical waste should be set up outside the warehouse. The warning signs of "no smoking, food and drink" should be put up in the warehouse;

7. To temporarily store pathological waste, it should have the conditions of low temperature storage or preservation.

(2) Medical waste storage places should be to establish the medical waste storage account (record), the collection of medical waste registration, including the source of medical waste, types, weight or quantity, the transfer time, final destination and handling signature and other projects, the registration records should be kept for three years.

(3) Medical waste transfer should strictly enforce hazardous waste transfer combined single system, carefully fill in the medical waste transfer, to ensure the conformity of the weight or quantity of medical waste storage ledger and metastasis associated form.

(4) No open storage of medical waste, medical waste storage time shall not be more than 2 days in principle. Prohibit the use of medical waste mixed with domestic waste.

### **The Disposal and Treatment Technology of Medical Solid Waste**

Common medical treatment methods are incineration, high pressure steam method, electromagnetic wave method, chemical disinfection method and plasma pyrolysis method.[7] Specific circumstances are as follows:

**Incineration.** Medical solid waste is mainly composed of waste paper, plastic, kitchen, wood and bamboo, fiber, leather, rubber, glass, surgery etc. Most of this garbage is organic hydrocarbons, in a certain temperature and oxygen conditions can be completely burning into ashes. After burning treatment, not only can completely kill bacteria, so that the vast majority of organic matter into an inorganic material, but also to reduce the volume of waste 85%-95%, making it difficult to identify waste. Thus greatly reducing the cost of the final landfill, eliminating the people's aversion to medical waste, and the technology is mature.

**High Pressure Steam Method.** To high temperature and high pressure steam to pass through objects inside, so that the microbial protein coagulation degeneration and death, with strong penetration characteristics of high temperature and high pressure steam, which can effectively prevent bacteria breeding body, spores and various viral and fungal spores. The method is simple and the floor area is small, but the treatment of the medical waste is limited.

**Electromagnetic Wave Disinfection.** The microbial cell polar molecular absorption characteristics of high energy, will be placed in a high-frequency electromagnetic wave oscillation energy field object under the action of electromagnetic wave energy absorption generated electromagnetic resonance and intensified molecular motion and the internal and external warming at the same time, kill the bacteria. This treatment completely, high sterilization efficiency, the area is also relatively small.

**Chemical Disinfection.** The mechanical crushing of the medical waste and chemical disinfectant fully mixed, and stay long enough to make the medical waste in the bacteria were killed. Then use the way of life garbage disposal to deal with the rubbish. This method does not produce by-products, but the types of pollutants are strictly limited, must be an antidote against the disease.

**Plasma Pyrolysis.** Using plasma generated by high temperature, kill medical waste in all microorganisms, destroying residual bacterial toxin tired drugs, bottles and toxic chemicals. Temperature can reach 1200 degrees Celsius, 3000 degrees Celsius, completely harmless, covers an area of small. But the technology is not mature enough, the operation cost is too high.

**Sanitary Landfill Method.** This is the ultimate disposal of medical solid waste. Sanitary landfill sites are usually set up in towns and cities. The landfill is provided with a waterproof layer to prevent the waste leachate from polluting underground water, and the leachate and the waste gas have special treatment facilities. After the first five kinds of medical waste treatment, the treatment of solid waste or residue is sent to the sanitary landfill for final disposal.

## Conclusion

China's social progress, the medical level is also improving, we should correctly deal with the attendant medical treatment of solid waste disposal problems. Set up good medical solid waste management and disposal system, to improve the level of medical treatment in our country, and will have a great driving force. The development trend of solid waste will toward stabilization (waste organic inorganic composition of), safety (the waste of toxic and harmful substances decomposed, kill bacteria and viruses disinfection), reduction (the treated waste weight and volume are reduced, difficult to identify the treatment of human tissues and organs, limbs illegible) direction.

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