

Information for doctors

The patient was injured by the High-Pressure Water Jet.

The injuries caused by the high-pressure water jet must be taken very seriously.
Various foreign objects spread over the injuries. The injuries are more extensive than they look because a large amount of water can enter the body through a small cut within a short time and harm there.

1 Possible Injuries by High-Pressure Water Jet

☐ **Cuts**

- Limbs sustain injuries and nerves, muscles and blood vessels can also sustain injuries.
 - Tissue sustains incised or seriously injured although apart from the cut due to the water jet’s impact.
 - Area of injured tissue enlarges around the jet hit point.
 - The water jet injures skin’s surface as well as anatomical structures.
- Skin tissue sustains widespread injuries and therefore medical treatment is hindered.
The injured tissue requires removal and surgical coverage using the suitable orthopedic method.

☐ **Crush injury**

- External injuries appear minor at first glance; however, bruises may appear and the injured area may ache more intensely.
Under the surface, the injured muscle tissue swells and compresses nerves and blood vessels.
This circulation failure may cause wide necrosis or neuroparalysis (Compartment Syndrome).
- Important organs, e.g., brain, heart, liver sustain injuries due to impact when water jet hits on the body surface overlying them.

☐ **Damage by contaminated water**

Water jet may include minute foreign objects e.g., abrasive, paint particle, oil, bacteria.
These foreign objects spread over tissue along muscle, nerve, tendon and blood vessel if water jet veers by hitting bone.
Extensive surgical operation is required to define the spread area of intruded foreign objects.

☐ **Other risks**

- Patient may sustain life-threatening shock due to severe pain.

2 Principle of High-Pressure Water Jet System

In the high-pressure water jet system, water is pressurized
by pressure generating equipment (pump) and sent to nozzle through hose or tube.
The pressurized water is discharged from nozzle as high-pressure jet.

3 Example of High-Pressure Water Jet Injuries against Human Body

☐ **Example of injuries**

- More than 7MPa the water jet injures skin
- More than 20MPa the water jet pierces skin and muscle
- More than 100MPa the water jet pierces bone

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