E48 An Unusual Work-Related Death at the Construction Site: The Half-Twisted Man

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Learning Overview: The goal of this presentation is to present an unusual injury pattern caused by a spiral screw pre-feeder for fresh concrete. The lower half of the body appeared to be severely injured and peculiarly twisted on itself; the upper half of the body, however, seemed to be uninjured. A similar lesion pattern has never before been described.

Impact on the Forensic Science Community: This presentation will impact the forensic science community by presenting an unusual pattern of injury in a work-related death.

Currently, the work-related fatal accident rate is slowly decreasing, but it still represents an important social concern.[1,2] According to the National Institute for Insurance against Accidents at Work (INAIL) of Italy, 1,089 Italian workers died from work-related injuries in 2019.[3] Construction industry workers seem to be at higher risk of death than other workers.[4] Often, the worker is killed when trapped in or between machines, equipment, or tools.[5] Unsafe behavior is one of the leading causes of work-related accidents in this field, and it has been suggested that a failure in the coordination between work operations may also have a role in increasing the occupational risk.[6,7] Herein, a case of an unusual work-related death in the construction sector is described.

A 48-year-old man was found entrapped in a spiral screw pre-feeder for fresh concrete by his colleagues during the daily work shift. The man was working with two of his colleagues when the fatality occurred. One of them started the machine for the production of fresh concrete, a twin-screw pre-feeder with two mixing axes, which was equipped with synchronized, counter-rotating spiral arms. The coworker, alarmed by terrible screams from the concrete mixer, stopped the machine immediately and found the man trapped between the two helical arms of the machine. The man remained alive for at least ten minutes after the emergency service's arrival but died during the rescue attempt. The judicial authority initiated an investigation and ordered the forensic pathologist to perform the autopsy. In such cases, the main issue was to describe the injuries found on the victim's body in order to reconstruct the traumatic event.

The machine involved in this case has two synchronized, counter-rotating, mixing spiral arms that produce different types of mechanical forces such as compression, traction, torsion, and shear stresses. This transfer of kinetic energy generates consequent tissue deformations and injuries with a peculiar pattern. In this case, extremely severe injuries were observed to the lower limbs, pelvis, and abdomen with minimal or no lesions on the upper side of the body.

The lower extremities seemed mutilated, skinned, and constricted to the point that a long operation was required to reposition the stumps. The right limb appeared to be completely amputated at the level of the proximal third of the thigh and ankle, with multiple fractures of the femur and tibia. The muscle layer of the right calf was completely exposed due to the complete skinning of the leg, and the skin seemed to be stretched upward and twisted around the longitudinal axis. The skin of the homolateral foot, however, seemed to be pressed down. The left limb, although not amputated, was also seriously injured, with several bone fractures and the absence of skin exposing the muscles. At the level of the femoral quadriceps, there were parallel oblique incisions. There were also comminuted fractures of the hip bone with complete exposure of the underlying muscles. Finally, there was a large abdominal breach. The edge of this abdominal lesion appeared excoriated and even here, parallel oblique incisions could be identified. The abdominal breach had caused several organs to leak out, including the small intestine and the omentum.

Reference(s):

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