



Sudden fall into A Dry Well: Life Saved but Laterality Snuffed Out

Authors

**Dr Mohammad Mojahid Anwar¹, Dr Mohammad Asrarul Haque², Dr Faiz Ahmad³,
Dr Munawwar Husain⁴, Dr Jawed A Usmani⁵**

¹MBBS, D.Oph, MD (std), JR-II

²MBBS, MD (std), JR-III

³MBBS, MD (std), JR-I

⁴MD, DNB, MNAMS, PG Diploma in Criminology and Criminal Administration, Professor

⁵MD (Path), MD (For Med), PG Diploma in Criminology and Criminal Administration, Professor and
Chairman

Department of Forensic Medicine, J N Medical College, Aligarh Muslim University Aligarh 202 002 India

Corresponding Author

Dr Mohammad Asrarul Haque

MBBS, MD (std), JR-III

Department of Forensic Medicine, J N Medical College, Aligarh Muslim University Aligarh 202 002 India

Email: asrar428@gmail.com, Mobile No.: +91 8755198534

Abstract

An unexpected fall of an adult man into a dry well leads to an unusual injury of the right upper limb leading to permanent crippling. This case report dealt below is unusual in the sense, that such type of injury generally do not take place when a person falls from the height of approximately 30 feet into a gravel and pebble filled bed of the well. The following narration is presented below sequentially.

Key word: Dry well, submersible pump, amputation of limb, coast of alcoholism

Introduction

Not long ago drawing water was frequently seen all over India and wells were dotted throughout landscape of rural India. Later with the advent of piped water and submersible pump, majority of the wells were closed down. However, few disused wells still remain open inviting catastrophe. The present case report is a measure of gross negligence and dim understanding that finally led to the loss of limb of unfortunate victim.

Case report

Mr X. aged 45 years male and resident of village, 10km south of district Kasgunj, India. As per the version of the hapless victim he went to the dry well in order to check whether the submersible pump was working or not. The mouth of the well was fully covered by sheet of strong iron. A window was cut and hinged so that the person can peep inside the well without removing the entire corrugated sheet. If required, he can manoeuvre himself through window opening and descend down the ladder fixed around the side wall of the

well. The victim elaborated that he went in the afternoon of 30th may 2015 to open the window and while endeavouring to look down, he lost his balance and fell down. He could clearly remember that he initially fell down through head but somewhere during fall his position changed so that his right shoulder and arm struck the bed of well.

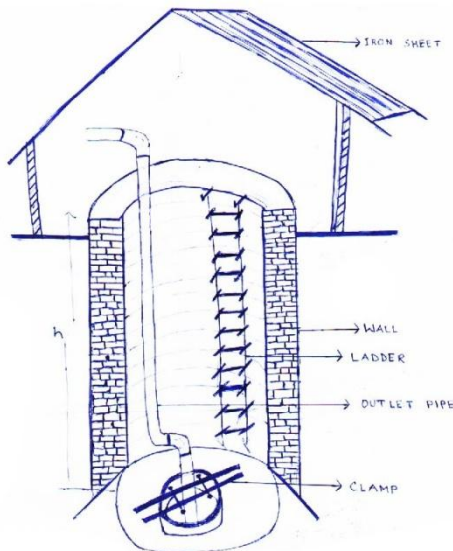


Fig: 1

The schematic diagram of well (Fig.1) shows the general architecture of the well. The central pipeline is connected to submersible pump and through this pipe water is carried to the field for irrigation. The central part of bed of well – as is evident in diagram - is occupied by the pump and lateral clamp holding it firmly in place. Unfortunately, the victim stuck the projection of the clamp on the right side of shoulder and arm. The injury sustained is the following in conformity with physical equation

- A. The upper mid right arm was badly bruised and mutilated. It was hanging by shreds of flesh and Ligaments
- B. A compound grade 3 fracture of right shaft of humerus visible on x'ray
- C. Severe damage to brachial artery of that side



Fig. 2 Photograph of right upper limb showing dissected brachial artery



Fig. 3 Photograph of x –ray of right upper limb showing compound # of mid humerus



Fig. 4 Photograph of right upper limb taken after surgical amputation



Fig. 5 X'ray of right upper limb taken after surgical amputation

Discussion

There have been many incidents – deliberate and non-deliberate – in which people have fallen in to the well and got drowned or miraculously saved. Women have jumped in to the well to save their honour¹ or commit suicide². Children have fallen down and got drowned while playing hide and seek³. In many cases the body have been pushed in to the well both as an act of homicide or after death to simulate the condition of suicide⁴. However, this case is scientifically interesting because the victim have fallen down and got injured grievously ultimately losing a vital part of the body.

Scene of accident reconstructed

It is not difficult to reconstruct the accident while applying the laws of physics to find out whether the injury sustained matches the victim's narration and rule out foul play.

A man, statured 5'6", 60 kg in weight, non alcoholic went to the see the functioning of the submersible installed in the bottom of the disused, dry well. Suddenly he tripped and there was a free fall down. However, because of his attempt to save himself he tried to protect the head while folding his upper limbs close to his body. The

momentum coupled with the struggle accelerated his fall according to the equation

Striking velocity of individual when he hit the ground. $V_1 = \sqrt{2gh}$

As we know pressure applied on individual, $P = \text{Force}/\text{area of striking surface (A)}$

$$= \text{Rate of change of momentum}/A$$

$$= m \times (v_2 - v_1) / dt \times A \quad \text{where } v_2 = 0 (\text{velocity of individual after strike})$$

$$= m(\theta \sqrt{2gh}) / dt \times A$$

$$= (-m\sqrt{2gh}) / dt \times A \quad (\text{negative sign indicate energy is lost})$$

As we know striking surface area and time of impact of body to striking surface is less so pressure applied on the body shall be to a maximal degree.

The full impact was felt along the left lower arm which struck the projections of the iron clamps of the submersible. The impact created a high kinetic energy he suffered compound fracture (Fig: 3). The muscles, skin and subcutaneous fascia were torn in to smithereens and the hand was left hanging through tags of flesh and tendons. He couldn't get immediate help. For about five hours he was lying there bleeding and shocked. The brachial artery was severely traumatised and profuse bleeding occurred. Later, when help arrived gangrene and septicaemia had already set in. The doctors at the tertiary centre tried to reconstruct the hand by resorting to vascular attachment surgery but failed. Amputation of the arm was done finally and a stump was left to be used later for attachment of prosthesis (Fig: 4)

Conclusion

This case deserves merit and the need to be published because out of all cases of fall through the length of a dry well this type of injury was not discernible. Caution need to be prescribed and lesson must be learnt from this episode. In addition to the trauma and its scale suffered by the victim the following emergency measures must immediately be taken to help the victim and minimise the after-effects of trauma.

A. Speed and proper medical care

- B. Referral or transportation to the hospital where vascular reconstruction surgery facility if available
- C. Proper boards and lighting must be installed in all cases where the risk of damage is accentuated by darkness or dim light
- D. Emergency hospital numbers / NGOs / Police etc, must be boldly and properly displayed at such places

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