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Case Report
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Avulsion Cassava Grating Machine Injury to the Penis: The Need to Stop Child Labor

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Abstract

We present the management of a 12-year old boy who had a degloving cassava grating machine injury to the penis. He was using a mobile cassava grating (miling) machine at about 8.00 pm when his clothes were caught by the pulley belt of the engine and his perineum was pulled to the machine. The entire penile skin- from the shaft to the glans was degloved. We used part of the scrotal skin as two delayed transposition flaps to reconstruct the penis.

Aim: To highlight a menace in our society that causes mutilation of the male child external genitalia.

Keywords: Grating machine; Cassava; Child labor

Introduction

A large part of the rural community in Cross River State of Nigeria, the setting of this case report, is made up of farmers and most of them grow cassava. The latter can be processed in different ways for human consumption. Most of the crop is used for the production of 'garri'. To produce garri, cassava must be peeled, washed, grated either manually by using a grater or by using a cassava grating machine before frying. The use of manual cassava graters has fallen out of favor because the process is slow and can give small abrasions to the hands. Machine grating is easy and more popular in recent years. The farmers go to the farm in the morning, harvest the cassava, and prepare it for grating as outlined above. These farmers return from the farm at about 6.00 pm and await the arrival of a cassava grating machine to their house. The cassava grating machine has undergone enormous changes over the years. In the 1980s they were heavier, diesel powered, mounted on wooden frames and two car tyres. These were difficult to push around the village in the night along untarred and uneven roads and compounds. The more modern cassava grating machines are petrol powered, mounted on motorcycle tyres and lighter, small iron frames (Figure 1).

The machines have a pulley belt that can trap the clothes of the operator and pull him to the machine causing devastating injuries to any part of the body, especially the male external genitalia. Apart from pulley belt injury to the penis and scrotum, the peeled cassava tuber has to be fed to the grater manually by pressing down until it is almost completely grated by the machine and in the process the hand can be trapped and injured seriously. To avoid hand injury the last part of the cassava tuber is feed to the grater with the aid of a small stick. The last maneuver does not completely eliminate hand injury especially for the inexperienced.

Case Presentation

This is the case of a 12-year-old primary school pupil in a rural community in Nigeria. He had no training on the use of cassava grating machine but was allowed to use it by his parents. The patient was wearing a shirt and baggy trousers. At about 7.30 pm he used his parents' machine to grate cassava. The pulley belt of the machine caught the patient's shirt and trousers, pulled him to the rotating pulley belt and completely avulsed the skin of the penis. There was profuse bleeding but no dizziness or loss of consciousness. Clothes were wrapped around the patient's waist and the external genitalia to stop heamorrhage. He was rushed to a private medical facility where reconstruction was done.

On examination he was fully conscious, mildly pale, anicteric and afebrile. The pulse rate was 90 beats/min, regular and full volume, the respiratory rate was 15 cycles per min and the blood pressure was 100/60 mmHg. Head and neck, chest and limb examination was normal. Examination of the external genitalia showed complete avulsion of the skin and the subcutaneous tissues of the penile shaft and glans penis. Figure 2 Preoperative picture of avulsion injury [1,2].

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Figure 1: Cassava grating machine. The pulley belt and the grating compartment are shown.

Figure 2: Preoperative picture of avulsion injury.

Figure 3: Horizontal mattress nylon sutures and scrotal skin flaps are shown.

The avulsed tissue was presented by the boy's parents but it was not suitable for reconstruction. The investigations requested and the results include an urgent packed cell volume which was 32% and a urine analysis which was normal. The patient received 0.5 ml of tetanus toxoid, intravenous normal saline, antibiotics and analgesics. Surgical repair was done in two stages.

Surgical technique

Stage 1: The findings on the operation table were a circumferential loss of the skin and the subcutaneous tissue of the entire penile shaft and the glans penis. With the patient in supine position and under total intravenous anaesthesia, the wound and scrotal sac were cleaned with savlon, normal saline and painted with 10% povidone iodine. The patient was catheterized with size 14 foleys cather. A longitudinal incision was made on the scrotum along the median raphe for about 6 cm which is the approximate length of the penis. The incision was deepened to expose the testicles. Heamostasis was achieved by ligation with vicryl 2/0. Numerous transverse vicryl 2/0 sutures were placed in the subcutaneous tissue of the scrotum to push back the testicles to a posterior position and thereby leave redundant scrotal skin anteriorly. Posterior to the penis but anterior to the testicles, horizontal nylon 2/0 sutures were placed on the skin to further maintain the testicles in a posterior compartment, reduce the blood supply of the two longitudinal scrotal skin flaps so created and serve as a delay procedure for these scrotal flaps [4-6] (Figure 3).

Figure 4: Penis and scrotum before removal of stitches.

Figure 5: Increased size of scrotal sac at first post operative visit.

The two longitudinal scrotal skin flaps were used to wrap around the penis and the wound was closed anteriorly with nylon 2/0 sutures. Therefore two compartments were created with the scrotal skin a posterior compartment containing the testicles and an anterior compartment containing the penis. This is the first stage of the operation which is a combination of wound cover and delay procedure because the horizontal nylon stitches reduces the blood supply of the penile skin and prepares it for the second stage of surgery.

Stage 2: After 14 days, an incision was made along the horizontal mattress sutures and this separates the penile from the testicular compartment. The wound on the ventral surface of the penis was closed with nylon 2/0 sutures. The testicular compartment was dilated by passing a heamostat into the compartment and opening the jaws. This action broke the vicryl 2/0 suture used to keep the testicles posteriorly and enlarged the compartment. The scrotal wound was closed with nylon 2/0 sutures. The wounds healed 7 days after the second procedure and all the nylon stitches and the urethral catheter were removed (Figure 4).

At the first post operative visit the scrotal sac was found to be significantly larger than the size at discharge from the hospital (Figure 5).

Discussion

The grating of cassava to make 'garri' or 'foofoo' is essential for the production of the above named staple food of Nigeria and most of the West African Sub-region [3]. However, the injuries sustained from cassava grating machine are life threatening and maiming. These injuries often involve the penis and the scrotum but may involve the hand sometimes [1,3,7]. The machines are operated mainly by children (boys) but occasionally by girls, as shown in Figure 1, between the ages of 10 and 18 years who did not receive any training for the job. Apart from lack of training, the use of the children constitutes child labor in a dangerous job and the government should compel the parents to stop this by legislation. In the rural communities, grating of cassava is done mainly in the night because the farmers come back at about 6.00 pm and by the time grating of cassava in one house is completed dusk has come and the machine must be pushed around a community without street lights, untarred, uneven roads and streets. Finally, fatigue sets in and any mistake by the child results in a life threatening injury in an environment where facilities for reconstruction are very limited. Various writers have documented this injury in Nigeria: Ounumegbu in Enugu, Eastern Nigeria used a full thickness skin graft from the arm to provide skin cover for the penis [3]. It has been noted that in western Nigeria traditional design of clothes make people from Yoruba tribe susceptible to cassava grating machine injury [3].

Our patient is 13 years old, he was not trained for the job, his injury occurred at 8.00 pm, the community has no street lights and the roads are untarred. All these factors may have contributed to the injury. We decided to use the scrotal skin for reconstruction because it is readily available and sexual satisfaction will be better with scrotal skin than skin taken from a distant site. However, this has reduced the volume of the scrotal sac. The ideal temperature for spermatogenesis is slightly lower than the body temperature and the hanging position of the testicles is important for this temperature. However, since the scrotal skin has a high capacity to stretch and expand, it is hoped that spermatogenesis will not be significantly affected because the sac size has increased at the first post operative visit. Aesthetic concern of the penis may be a problem because the coronary sulcus is lost and the glans penis cannot be seen distinctly from the penile shaft but since the penis is usually covered the patient can be reassured that the absence of an identifiable glans penis from the penile shaft does not prevent fertility neither does it affect sexual intercourse (Figures 4 and 5). There is a possibility of urethral meatal stenosis but this complication has not occurred in our patient. However, we will continue to follow up the patient for possible fertility or obstructive complications.

Conclusion

Cassava grating machine injuries are life and penile threatening. The government should prevent the use of child labor for cassava grating and adults should train before using the machine.

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