TRAUMATIC DECORTICATION IN THE EXTERNAL GENITAL REGION DUE TO A RICE-CLEANING MACHINE ACCIDENT

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INTRODUCTION

Decortication of the male external genital organs is comparatively rare excepting war injuries, but with the development of mechanical industry, this seems to be gradually increasing. We assume this from the fact that the investigation of the cases histories of fifty-seven cases in foreign countries and thirty-one cases, including ours, in Japan shows that about 80% of the causes are due to mechanical industrial accidents, and there are very few cases with other causes.

Decortications of the external genital organs are generally classified by the degree of seriousness as follows : decortication of the penis, of the scrotum, and of both the penis and the scrotum. We have experienced recently a case of decortication of the genital organ in a severe degree and that decorticated skin was kept in almost perfect form, so we report on this interesting case, and its postoperative process of the synthetism of the decorticated skin, adding some considerations of literature.

CASE

Patient : Kano, fourteen-year-old-male, junior high school student.

Primary diagnosis : March 2, 1958 (Showa 33)

Family history : Healthy parents ; no noticeable diseases in his seven brothers and sisters ; no hereditary elements such as cancer in any of them.

Past illness : No special illness.

Present illness : On March 2, 1958, while he was helping his family with the work of the rice-cleaning machine, his trousers were rolled into the belt of the rice-cleaning machine and the crotch of his trousers and shorts was torn off, and simultaneously he fell down from a three-meter-high place, landing hard on his shoulder. In his torn-off trousers the decorticated skin of the penis and the scrotum were found, so he visited a neighbourhood clinic with the skin and received emergency treatment there before he called at our clinic. Hemorrhage at the time of the accident was said to be very slight.

Findings at our department : The boy's body construction was fairly good and his nutrition was good, but his face was rather pale with a slight cold sweat. He could respond clearly and did not appear to be in great pain.

No medical change was found on his abdominal organs by touching diagnosis, but there was a five cm sized-wound on the outer side almost at the middle part of the

right pelvic limb, and also subcutaneous hemorrhage and a friction wound from the blow on his right cheek. He complained of severe pain when moving his right upper arm and scapular regio, so we asked the orthopedist for a roentgenogram, which showed the fracture of the right humerus and the luxation of the right scapular joint. The syn-
thetism by hand we done under general anesthesia, and gypsum setting followed.

Blood findings : Erythrocytes 3,620,000 leukocytes 6,900, hemoglobin 82% (Sahli). Analyzing the leukocytes, it was found that there were acidocytes. 2%, staff cell 12%, segmented cell 49%, lymph cells. 32%, and monocytes 5%. erythrocyten sedimentation rate was 46mm per hour with 38.25 of the middle index. The compluetic reaction was negative and nothing on the liver function was found.

Findings on the external genital region : As shown in Figure 1 and 2, the skin was wholly decorticated from the coronary ditch toward the root of the penis, leaving just the glans. The scrotum was perfectly separated from both sides of the upper femoral region, the perineal region, and also from the regio pubica, and decorticated, being connected to the skin of the penis only. The edge of the wound was all sharp and fleshy, like an incised. Hemorrhage was hardly recognized. The testicles revealed wholly the tunica vaginalis and hung between the groins by both sides of the spermatic cord. Macroscopically, no change was found in the spermatic cord, testicles, and epididymis. The decorticated skin was brought, and it was found by the examination in detail on it that there was no lacerated wound on both parts of the penis and the scrotum, but it was left intact. In other words, the skin of the penal part was left in a cylinder shape and the funnel-shaped skin of the scrotum adhered to it. It was, therefore, pulled off in one piece (Figure 3).

From the above-mentioned findings, a restorative surgery by synthetism of the decorticated skin was considered in this case ; the skin was kept, therefore, in lukewarm salt water added with Penicillin.

OPERATION

It was two hours later when the operation was begun, but no hemorrhage from the wound was recognized. After cleaning and disinfecting the sphere of the wound, the penis was inserted into the penal part of the decorticated skin, and both testicles and epididymis were inserted into the scrotum part of the skin. The skin was sutured on the part of the coronary ditch, and the scrotum on the inside of both upper femoral region, perineal region and regio pubica, and a gauze drain was inserted into the perineal region. The median discission on the lower abdomen followed and the none end catheter was fixed to the extracted bladder (Figure 4).

Outline of the postoperative process : Administering Penicillin, Brystacycline, Neocycline, and other sulfamins, disinfection was tried. On the second day after the operation the skin of the scrotum looked dark red, and slight edema was seen on it. On a part of the skin, blisters were recognized. On the third day irradiation of artificial sunlight was used since the color change increased and blisters were also found on the root of the penis.

Since then irradiation was continued during the change of gauze, but when the stitches were removed a part of the scrotum skin, especially the perineal region, turned

dark brown and was hardened, and moreover, the skin of the penis changed color distinguishably. However, the sutured part on the regio publica looked clean and union seemed to be proceeding. On the twelfth day most of the scrotum skin withered and the part of the penial skin around the glans was also withering, and granulation was revealed there. So Rivanol gauze was used.

On the twentieth day the testicles were covered with the growing granulated tissue, although most of the scrotum skin had fallen off. Since the granulation was seen after both skins of the penis and the scrotum were wholly dead and had fallen, the none end catheter was taken out. Then the skin grafting by the pedicle graft was considered for use, but as noticeable epithelization was recognized on the peripheral part, a pack of 1% boric acid solution was applied after using zinc oil. Observing it then, epithelization on the peripheral part was so remarkable that thumb-top-big-epithelization was seen on a part of the back side of the penis. From the fortieth day neohaliva ointment was applied partly on that part, with the co-use of artificial sunlight irradiation (Figure 5). Afterward chlorophyl was also used, but it was not very effective, so it was stopped a week later. On the sixtieth day the wound had shortened to half, and stopping the artificial sunlight irradiation, only zinc oil was applied.

Since epithelization on both the epipheral and the back side of the penis was remarkable, the granulated part of the penis became very small. By the eightieth day, the granulated area became as small as the top of the thumb, and epithelization was almost completed (Figure 6). Neohaliva ointment was used again, and scarhealing was recognized beginning three months after the operation.

The examination when the patient left our department: The penis was a little crooked, and a slight unevenness was recognized on the coronary ditch part, but as a good result a case of the skin grafting by was obtained. The sexual function after the operation could not be examined, but if it is necessary restorative surgery would be possible in this case. With the promise to return at such a later date, he left our department. No pain was felt with erection, and no dysuria was found.

RESEARCH

The reports of traumatic decortication of the male external genital region have been reported in fifty-seven cases in foreign countries, starting with Dermarquette's report in 1841, and in Japan since Imoro's case in 1922 thirty-one cases including this case have been reported.

Among them there have been seven cases of decortication of the penis, six cases of the scrotum, and eighteen cases of both the penis and the scrotum. No case of decortication of female external genital organs has been reported probably because of the anatomical reason. This decortication is classified as mentioned before into penis, scrotum, and penis and scrotum decortication.

It is reported by Shida that the most severe penis-scrotum decortication is accompanied by the inverted triangle-shaped decortication which has its base on the regio-pubica joint and the root of the penis and its top on the perneal region regardless of its cause of injury, and in this case the same findings, even though it was wider, were recognized. From the fact that the edge of the wound was very clean-cut, hemorrhage was

comparatively less, and almost no damage was found either on the penis itself or on the scrotum due to the separation of the skin from the connecting tissue, which has been reported by Shida. Thus, in such a case, regardless of the cause of injury, it is supposed that decortication happens in a certain region with a certain process.

By a statistical investigation concerning the injuring instrument which causes this decortication, it is noted that twenty-four cases (77.4%) in thirty-one cases were due to rolling of the clothes into the belt of a machine, or into the shaft, and six cases, that is, 25% of them happened in the belt of rice-cleaning machine.

In our case, this patient had this accident while he was helping his family work at rice-cleaning, and from this point the persons who work with this rice-cleaning machine, in which this accident happens in the highest rate, should be extra careful. Three cases of the iron industry follow, and printing, and spinning industries are pointed out also.

As an exception, Stromyer and Fuchsing reported on a case in which the patient was hit by a dog, and in Japan Jimori reported on the case caused by a wife's jealousy and Arai's case was of a small child having an accident while being cared for by a helper. All of these cases were the decortication of the penis only.

Concerning the patient's age, ten cases were patients from ten to nineteen years old (30%), and seven cases (22.6%) of from twenty to twenty-nine follows. There have been two cases both of under nine years old and over forty years old, that is 6.5% of the total. That there are many cases of 20 to 40 year-old patients may be explained from the fact that the group is most active; it is difficult, however, to explain that most cases are from ten to nineteen years old. Most of them being apprenticed workers, their unmaturing technique and unsettled psychological state are supposed to be the greatest reasons. The cases of under nine years were one being cared for by a helper, and the other in which the child was playing on a gymnastic bar having his trousers rolled as he turned over and over; the latter was reported by Hata and Kurata, and was that in which only the foreskin of the penis was decorticated.

About the side damage, Shida mentioned that in most cases both the penis and the content of the scrotum were not damaged, but it is sometimes easily supposed that the corpus cavernosum of the penis, the urinal cord, the testicles, the epididymis, or the spermatic cord would be damaged. According to literature research it is known that in severe cases the cases of diuresis digeresis of the penis (Kj6ng), of the testicles (Jenkel), of the glans (Meyer), and of puncture of the urinal cord have been reported, but other cases with fracture and luxation as in our case have not been reported yet. The machines are usually on the ground, and this may be the reason for the fewness of cases like this. In this one, both the fracture and the luxation were healed before the patient left our department.

Investigating the literature concerning the methods of treatment, 1) the synthetism method of decorticated skin, 2) the Dittel method, 3) pedicle graft method, 4) the Thiersh method, 5) the subcutaneous sunken testicles method, and 6) conservative therapy have been known.

In this cases, synthetism of the decorticated skin was tried since only two hours had passed after the accident and, moreover, the decorticated skin was brought in almost perfect form, but this method failed, the skin withering away. Then, the conservative therapy of ephthelization was done. The former method is generally said to have a high

rate of success when the decorticated skin has some connection to the injured part, but little hemorrhage of the injured part seems to be one of the reasons for failure. The second treatment which we used in this case, that is, conservative therapy, is usually known to have the tendency of causing the shortening or changing of the form of the penis by the shrinking of the scar, although no great difficulty is seen with the scrotum. Labrevoit gave the conclusion that in the former case sexual intercourse is impossible. In this case the penis shrunk to a certain degree, but there was not much change in the structure of the penis, and it could have been prevented altogether by more careful observation. The problem about sexual intercourse is not solved and the method of restorative surgery will be left, however, for the future, if necessary.

The Dittel method, in which the foreskin of the penis is left and pulled to cover the damaged part of the penis, tends to cause edema and has a low rate of success. It was impossible in our case. The pedicle graft is mostly used and it is done by suprapubic tunnel graft, femoral tunnel graft, scrotal tunnel graft, or pedicle graft simplex, but each of them has advantages as well as disadvantages. The reason why we did not choose this method was that the injured area was rather wide and epithelization was rather rapid, and also prevention of the changed or crooked form of the penis was expected fairly positively; there were no other special reasons.

Statistical investigation on the treatment of the penis among the cases in Japan showed that pedicle graft was used most (56.5%) and synthetism of the decorticated skin was used in 17.4%, but these were all cases in which the decorticated skin was connected with the injured part, and not any case like this one in which it was completely separated. There has never been a case in which the conservative therapy was used, and the reason was as mentioned before.

About the treatment of the testicles and the scrotum, the subcutaneous sunken method was used in most cases (33.3%) and restorative surgery of the scrotum and conservative therapy were 20.8% each in use. This seems to be due to the fact, as mentioned before, that conservative therapy leaves few functional difficulties.

Concerning the postoperative sexual function, 84.6% of thirteen cases of the decortication of both of the penis and the scrotum were reported to have been restored to the normal function. The cases which left some difficulties were two which were reported by Shudo and Maki, and in the former case no detailed report was mentioned on the treatment on the penis. The latter case was the dieresis digeresis of the penis. In our case the patient was too young for investigation of sexual function.

CONCLUSION

We have experienced a case of the traumatic decortication in the external genital region, with fracture of the right humerus and luxation of the right scapular joint of a fourteen-year-old-boy and did the synthetism of decorticated skin-method and also the conservative therapy afterward, adding some considerations of literature.

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EXPLANATION

- Fig. 1 Left shows the sphere of decortication of external genital region. Right shows the setting reduction of decorticating skin.
- Fig. 2 Finding of external genitalia when he called at our clinic.
- Fig. 3 Decorticating skin brought with patient when he called at our clinic.
- Fig. 4 Setting reduction of decorticating skin.
- Fig. 5 Finding of external genital region one month after setting reduction, showing epithelization of the penis and granulations tissue of the scrotal portion.
- Fig. 6 Finding of external genitalia three month after setting reduction, showing epithelization of the penis and scrotal region.

Fig. 1 *Fig. 2* *Fig. 3*

Fig. 4

Fig. 5

Fig. 6