

Fetal Injury due to the Vacuum Extractor

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AFTER the reports by Malmström,^{15, 16} the vacuum extractor has been used extensively in many countries, especially in Europe and South America. Although this instrument has been used only a few years, many authors^{2, 3, 5, 7-9, 11, 21} believe that it could replace the obstetric forceps to advantage; all insist that it is harmless.

We believe that the vacuum extractor is as traumatic, or perhaps more traumatic, than any other extraction instrument, and it is the purpose of this report to present our observations in 100 consecutive applications of the vacuum extractor.

Analysis of published reports shows occurrence of a variety of superficial lesions of the fetal head to which those who are enthusiastic about the device pay little attention. These superficial lesions have been reviewed recently by Chalmers and Fothergill, who cite as among them artificial caput, small ecchymoses, minimal ulcerations, scalp necrosis, and cephalohematoma.

They state that these lesions completely disappear in a few hours or days after delivery. That this is not completely true is shown by Malmström,¹⁵ who has published photographs of scalp lesions visible for 10 days after delivery; by Berggren, who observed caput and ulceration for 7 days in 10 of 73 cases and for 30 days in 3 others; and by

Krabisch, who saw scars in the scalp 1.5-4 cm. in diameter many months after birth.

Bruniquel and Israel have described phlyctenae and hematomas, and Pigeaud^{19, 20} reports avulsion of the skin ". . . more extensive than would be desirable and, in every case more troublesome than the slight marks which can be found, eventually and exceptionally, as consequences of a forceps application. . . ." The latter has prohibited use of the vacuum extractor by young doctors in his hospital. Santacroce observed septic processes at the site of the vacuum device's application; Fulst reported extensive subcutaneous hematoma, and Krabisch 1 case of alopecia in the zone of the suction cup application.

Although such superficial lesions might be ignored, this cannot apply to the intracranial hemorrhages and fetal deaths reported in some series: 1 fetal death (tentorial tear) in 100 cases;⁵ 1 meningeal hemorrhage in 75 cases;¹ 1 meningeal hemorrhage in 200 prophylactic applications;¹⁹ 2 cerebromeningeal hemorrhages in difficult extractions amongst 148 applications;² 2 fetal deaths in 60 cases;¹³ and 1 case of meningitis.²² Furthermore, the possibility of icterus and kernicterus due to reabsorption of cephalic hematoma has been mentioned.⁹

For these reasons doubts have been raised about the supposed absence of fetal lesions; Eastman wisely has said: "This is the sort of thing [tentorial tears] that many people are

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Submitted for publication May 1, 1961.

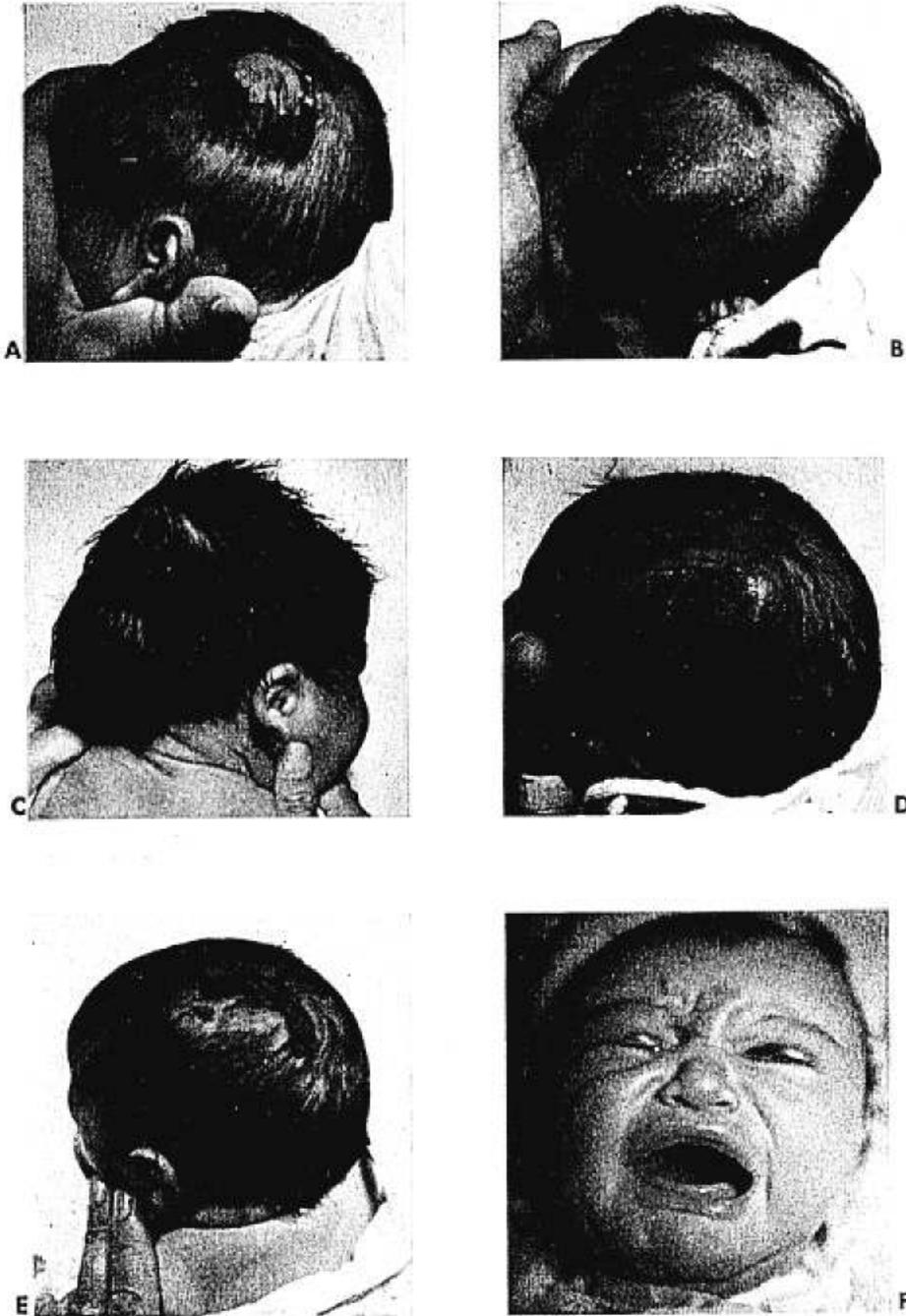


Fig. 1. A. Marks of the cup many days after birth. B. Deep and cutting marks of the suction cup. C. Cephalohematoma from occipital to malar region. D and E. Avulsion of the skin. F. Palpebral hematoma in meningeal hemorrhage.

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worried about in connection with the vacuum extractor and which poses a question that has not yet been completely answered."

There is, however, a tendency to attribute these lesions to other causes and not to the extractor, as in the work of Rosa, who through elaborate calculations apparently confirmed the absolute innocuousness of this instrument; of Estrella,⁹ who tried to show with experimentation in one deadborn fetus, that suction does not produce radiographic alternations in cerebral ventricles previously injected with radiopaque substance; and of Fulst, who observed no lesions in the fundus oculi of newborns by ophthalmologic examination.

MATERIAL

In the Concepción Palacios Maternity Hospital of Caracas, the vacuum extractor was received with enthusiasm. In 2 years, more than 500 extractions were performed by the resident staff. Some fetal consequences were soon observed, especially a huge subcutaneous cephalic hematoma and intracranial hemorrhage, which prompted the study reported here.

One hundred consecutive newborn cases covering the period June to November 1960 were observed. Noted were all indications, degree of cervical dilatation, and plane of engagement. Each baby was followed day by day while hospitalized, and all lesions observed were carefully noted by the authors.

RESULTS

Of the 100 babies only 1 had no lesion; the other 99 showed, among the superficial lesions, artificial caput, ecchymosis, ulcerations, phlyctenas, deep marks of the suction cup, and avulsion of the skin (Fig. 1). Artificial caput was the most frequent lesion (86 cases) and its place, extension, consistency, and duration showed a great variation—from a small, soft tumor, which disappeared in a few days, to an extensive infiltration (in one instance from the occipital to the malar

region) which was hard, painful, and persisted over 11 days. Some babies were sent home 9 or 10 days after birth with the tumor still present. In 10, the suction cup left a deep cutting mark, and in 3 there was avulsion of the skin. The more frequent combinations of these lesions were: artificial caput and ecchymosis (22); artificial caput, ecchymosis, and phlyctenas (15); and artificial caput, ecchymosis, and ulcerations (12).

There were 8 cases of intracranial hemorrhage. Of 3 clinically diagnosed with definite symptoms and positive lumbar puncture, vacuum extraction had been difficult in 2. Of 5 proved by autopsy, there was no direct relation between fetal death and the application in 2, because the causes of death were bronchopneumonia and amnionitis, respectively; however, meningeal hemorrhages from tentorial tears were found in both. In the 3 other cases (all with intracranial hemorrhage and tentorial tears) there was no cause other than the use of the vacuum extractor.

Two babies showed abnormal skulls by radiography, one a marked separation of the parieto-occipital suture—the site of the vacuum application—and the other a parietal fissure.

Four babies exhibited rigidity, hypertonus, and convulsions, but were not definitely classified as having meningeal hemorrhage.

There were 12 cases of icterus, without Rh or ABO incompatibility, and with bilirubin up to 14 mg. %. Although we cannot prove the etiology of such icterus, this is certainly a very high incidence.

COMMENTS

From our observations we feel justified in the conclusion that the Malmström's vacuum extractor cannot be considered an innocuous instrument. On the contrary, it is a dangerous one whose use should be limited to the experienced obstetrician with a thorough knowledge of its principles, technic, and limita-

tions. We do not believe that the vacuum extractor should be used indiscriminately as a substitute for obstetric forceps, especially in those circumstances in which we do not use forceps.

Unfortunately, analysis of the published reports does not permit a clear orientation about certain aspects which might influence the fetal prognosis. One of these is the stage of labor in which the vacuum application can be initiated. Some authors wait for complete dilatation of the cervix; others use it with incomplete dilatation, especially Lillie, who employs it when the cervix is 3 fingers dilated, stating furthermore: "I think that any obstetrician who is reasonably skilled in the use of forceps will find few indications for the vacuum extractor in the second stage of labor. I feel that the chief indication for its use is in cases of prolongation of the first stage of labor due to inefficient uterine action." Such early use requires a prolonged period of traction that, in one case cited by Santacroce, was maintained for 17 hours and ended with meningitis a few days later. Antoine has abandoned this practice because of the skin necrosis it produces⁵; other authors emphasize that the vacuum extractor should not be applied to the fetal skull more than 30-40 min.

Another point not clarified by analysis of the reports is that concerning engagement. Pigeaud,¹⁰ on the basis of 1200 cases, concludes that the extractor should be employed only when the head is on the perineum and only to help its extension. Even where it was used only in such low stations, Pigeaud reports, there was one meningeal hemorrhage. Others recommend that it be used when the fetal head is in station III or II plane and also when floating. It is our opinion that it is wrong and ill-advised to return to high application of any extractor instrument when we have an excellent substitute in cesarean section. Furthermore, in lower applications the obstetric forceps is easier and less traumatic, as has been repeatedly demonstrated.

The way in which the suction system and the apparatus itself is used is another unclarified aspect that might influence the fetal prognosis. There is need of an adequate technic in relation to the progressive and slow elevation of the pressure in the system, the correct application of the suction cup, and the proper direction of the traction. Some authors believe that the suction system is inadequate: Martius employed an electric pump, to develop and maintain safer vacuum pressure. Others^{4, 18} are testing new models designed to avoid injury.

We believe that the Malmström vacuum extractor has not yet reached the level of development necessary to replace the obstetric forceps. Its use is accompanied by the same risks common to other extractor instruments.

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