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BREECH PRESENTATION DELIVERY CARE: A REVIEW OF CHILDBIRTH SEMIOLOGY, MECHANISM AND CARE

Atención del parto con feto en presentación pelviana: revisión de la semiología, el mecanismo y la atención del parto

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ABSTRACT

Objective: To review the concepts underlying breech presentation delivery as well as the semiology and the obstetric maneuvers contributing to successful perinatal and maternal outcomes.

Materials and methods: Based on a hypothetical scenario to set the stage for a practical approach to the topic, an explanatory paper built on a narrative review is created in order to examine the principles related to diagnosis, mechanism of delivery and maternal care, emphasizing maneuvers to ease fetal extraction.

Results: Breech presentation delivery must be managed through the vaginal canal when already in the expulsion phase with fetal engagement. For diagnosis and care, it is essential to know the unique semiology and physiology of this condition as well as the obstetric maneuvers to facilitate an uncomplicated delivery.

Conclusions: The mechanism of childbirth in breech presentation is complex and requires knowledge of its physiology and multiple obstetric maneuvers by the obstetrician as well as the general practitioner, in order to ensure adequate care when there is no other option.

Key words: Breech presentation; obstetric complications of childbirth; continuing medical education; dystocia.

RESUMEN

Objetivo: revisar los conceptos que subyacen al trabajo de parto con feto en presentación pelviana, su semiología y las maniobras obstétricas que facilitan un resultado materno perinatal exitoso.

Materiales y métodos: a partir de un caso hipotético que ambienta de manera práctica el tema, se crea un documento explicativo construido a partir de una revisión narrativa, en donde se examinan los preceptos relacionados con el diagnóstico, el mecanismo del parto en presentación pelviana y el manejo intraparto de la gestante, con énfasis en la

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adecuada ejecución de las maniobras que facilitan la extracción fetal.

Resultados: el parto en presentación pelviana debe ser atendido por vía vaginal cuando se encuentra en periodo expulsivo con encajamiento cumplido. Para su diagnóstico y atención es esencial hacer una adecuada identificación de la presentación, así como conocer su fisiología, la indicación y adecuada ejecución de las maniobras obstétricas que facilitan un parto sin complicaciones.

Conclusiones: el mecanismo del parto en presentación pelviana es complejo y requiere, cuando no hay otra alternativa para la atención, que tanto el obstetra como el médico general conozcan su fisiología y las múltiples maniobras obstétricas que facilitan obtener buen resultado materno perinatal.

Palabras clave: presentación pelviana; complicaciones obstétricas del parto; educación médica continuada; distocia.

INTRODUCTION

Breech presentation occurs when the pelvic or caudal end of the fetus is in direct relationship to the upper strait of the maternal pelvis, filling it completely, and follows a known childbirth mechanism (1). Three modalities of breech presentation are considered: complete, frank and incomplete (2).

Complete breech occurs when the fetal thighs are in flexion over the abdomen and the legs are on top of the thighs. In this modality, the flexed fetal position is maintained in all the poles of the fetus (3). *Frank breech* (simple breech) occurs when the fetal thighs are in flexion over the abdomen but the legs are straight; it is the most frequent of the three modalities, occurring in 64% of cases (4). Finally, *incomplete breech* (partial presentation) occurs when one or both feet are closest to the birth canal (1); the fetus is literally standing in the birth canal in a true feet-first presentation. The Spanish school does not accept this modality, considering it just a transient phase as the fetus moves into one of the two positions described above (3). This modality is considered the worst in terms of prognosis for the spontaneous course of childbirth, given that it is frequently associated with arm deflexion at the fetal shoulders (nuchal arm extension) and deflexion of the cephalic pole (3).

According to the literature, it is estimated that 20% of fetuses less than 28 weeks of gestational age are in breech presentation (5) and, of these, 4% will remain in that position beyond week 36 (6); consequently, this presentation can only be considered abnormal at term (1). As the pregnancy advances, the fetus must accomplish "fetal version" as a result of an active phenomenon in which the healthy fetus adopts the "best fit" position, following the classical principles of Pajot's laws (5). Therefore, breech presentation at the end of gestation is a finding that prompts the search for a triggering factor (5, 7), which may arise from the presence of maternal (1, 2) or fetal pathologic conditions, mainly fetal anomalies or aneuploidy, altered amniotic fluid dynamics, disruptions of the birth canal, abnormal placentation (8) or fetal demise (1, 2, 5). It is important to highlight that the frequency of major fetal anomalies is 17% in premature breech deliveries, 9% in term breech deliveries, and 50% in neonates born in that presentation who then die (9).

Breech presentation fetuses have higher morbidity and mortality when compared to those born in cephalic presentation, even if they are born by cesarean section (5). Multiple studies have found an association between breech presentation and an increased risk of neonatal death (relative risk [RR] = 2.3; 95% confidence interval [CI]: 2.1- 2.6) (10) or fetal demise (RR = 12.52; 95% CI: 7.86-9.95) (11), prolonged labor (RR = 8.05; 95% CI: 3.00-11.47), asphyxia (RR = 10.24; 95% CI: 4.92-21.31) (12), trauma (RR = 9.9; 95% CI: 1.8-55.6) (13) or low APGAR score (RR=2.4; 95% CI: 1.1-4.6) (14). These results confirm that this presentation is in itself a marker of poor prognosis (7, 15).

The scenario in clinical practice is not very encouraging either. A recent study shows that not even

15% of obstetricians feel confident when it comes to vaginal delivery of a fetus in breech presentation, and only 32% are trained to solve this clinical condition (16, 17). In view of this scenario, with a low level of confidence, the anxiety that surrounds this process, the fear of malpractice lawsuits, and the challenges imposed by this situation, many people resort to universal cesarean section (18, 19).

There are occasional instances in clinical practice in which patients arrive when the fetus has descended into the birth canal and is engaged in the pelvis. Therefore, the objective of this document is to review the concepts underlying labor with a fetus in breech presentation, as well as the semiology and obstetric maneuvers that contribute to successful maternal and perinatal outcomes.

MATERIALS AND METHODS

Explanatory document created using a hypothetical case in order to offer a narrative review of the concepts related to diagnosis, the mechanism of childbirth and care of the pregnant woman, finishing with the maneuvers that help with the process of fetal extraction.

CLINICAL SCENARIO

A 39-year-old woman with no relevant medical history, in the 37th week of the third gestation, who attends the local referral hospital complaining of regular painful uterine contractions and the urge to push. She had not attended prenatal visits. She reports spontaneous rupture of membranes one hour before. The physical examination by the physician on duty shows evidence of expulsive stage of labor, 100% effacement, 10 cm dilation, fetus in complete breech presentation, with grade I meconium expulsion and +2 station. Orders are given to transfer the patient to the operating room for emergent cesarean section and obstetric assessment. However, a couple of minutes after the assessment, the urge to push increases and fetal parts are seen at the introitus: vaginal delivery is impending.

REVIEW OF THE LITERATURE

Elements of obstetric semiology in brech presentation

Labor with the fetus in breech presentation is diagnosed by means of maternal abdominal palpation (Leopold maneuvers) in order to determine fetal presentation, position and attitude, and try to ascertain the presence of cephalic extension which could create the risk of retained after-coming head (6, 20, 21). The clinician must not forget that auscultation of the fetal heart at the upper part of the maternal abdomen must lead to suspicion of this presentation (1, 2).

In the context of established labor, the practitioner must perform a vaginal exam in order to identify the presentation landmarks (6, 20-22). If the cervix is sufficiently dilated, palpation reveals an irregular, soft surface, with bumps and dips; a mass divided into two because of the presence of a rather pronounced sulcus (intergluteal cleft), with a small pit in the middle corresponding to the anus (22, 23).

In one of the ends of the cleft it is possible to identify a small, slightly flexible bony triangular ridge, which corresponds to the coccyx and, above it, three or four bony protuberances that correspond to the sacral crest, landmark of this presentation. The sacrococcygeal prominence is essential for the diagnosis of the presentation and it is almost always easy to recognize (22, 23).

To make the distinction between a foot and a hand during the exam, the practitioner needs to bear in mind that the foot is recognized because of the three bony protuberances (malleoli and heel, the angle at the level of the calcaneous and disposition of the toes: short, lying along the same line, with no opposing thumb). Finally, it is essential to remember that, from the point of view of position variation, the intergluteal cleft plays the same role as the sagittal suture for vertex presentation (23), palpation of some degree of gluteal "asynclitism" being frequent.

Mechanisms of labor in breech presentation

There are three consecutive steps to breech presentation: a) pelvic delivery, b) shoulder delivery and, c) head delivery. Each of these segments are increasingly difficult delivery because of their increasing diameter: the bitrochanteric diameter being smaller than the biacromial, which in turn is smaller than the occiptofrontal diameter (23, 24). León, in a classical obstetrics text, described the mechanism of breech delivery in ten cardinal movements (23), as listed below together with the recommendations of professor Peralta Cayón (24).

- Stage one: Seating of the buttocks in the upper strait (23) as a result of the shrinking diameters due to compression and the fetus forming a ball. This shrinking occurs simultaneously with orientation towards an oblique bitrochanteric diameter of a relatively fixed length of 9.5 centimeters, which will preside delivery (24).
- Stage two: Pelvic pole engagement and descent. This happens as a result of simple advancement in an oblique direction, with slight posterior asynclitisim identified by the posterior buttock descending lower than the anterior buttock, and the intergluteal cleft being closer to the pubis than to the sacrum. Engagement is completed when the lower strait is reached. This stage is arduos in complete breech and versatile in incomplete breech (24).
- Stage three: Seating of the fetal pelvic pole in the lower strait of the maternal pelvis. Presentation engagement usually occurs in some form of oblique position, including four possibilities: left sacrum anterior, right sacrum anterior (LSA and RSA, respectively), and left sacrum posterior, right sacrum posterior (LSP and RSP, respectively). A 45-degree internal rotation occurs once the fetal pelvic pole is in contact with the lower strait. In the anterior varieties, there is a 1/8 of a circle backward rotation, whereas in the posterior varieties an equal forward rotation occurs. This is the first of the classical rotations in breech delivery. Internal rotations refer to mechanisms occurring in the birth canal while external rotations refer to fetal parts mechanisms outside the birth canal (23).
- Stage four: It marks the release of the pelvic pole (Figure 1). The pelvic pole will detach in transverse sacrum, the bitrochanteric diameter matching the anteroposterior diameter of the lower strait (subpubic-sacrum), thus achieving a transverse orientation of the intergluteal cleft. The anterior buttock, landing under the pubic bone, half-opens the vulvar orifice, while the posterior buttock pushes the coccyx backwards, causes the perineum to bulge and becomes exteriorized; it is only then that the anterior buttock is fully released. At this point of the expulsive phase, the fetal body is presenting a lateral inflection, describing a curve with the concavity pointing towards the pubic bone. Usually, in cases of complete breech presentation, the lower limbs are expelled at the same time as the buttocks (23).
- Stage five: Seating of the shoulders on the upper strait. The upper limbs are in forced flexion, shortening the biacromial diameter before adjusting to the oblique diameter through which the bitrochanteric diameter passes in the case of the anterior variety. For posterior varieties, the bitrochanteric diameter matches the opposite oblique diameter. The oblique orientation of the shoulders explains why the fetal trunk goes into external rotation (restitution) from an oblique orientation forward. The fetal dorsum becomes subpubic. The second 90-degree rotation takes places during this stage and it is designed to place the fetus with the spine in anterior position underneath the symphysis pubis (23).
- Stage six: Shoulder engagement and descent. By this time, the abdomen and the most inferior portion of the fetal chest have been delivered (23).

Figure 1. Detachment of the fetal pelvic pole. Left sacrum transverse position variety; the intergluteal cleft is transversely oriented (arrow)

– Stage seven: It marks seating of the shoulders in the lower strait as a result of 45 degrees of internal rotation, in such a way that the biacromial diameter matches the subsacral subpubic diameter. This is the third rotation in which the biacromial diameter becomes anteroposterior at the level of the lower strait and the fetal dorsum points to the right or to the left side of the mother (4). During this time, the head is seated in the upper strait by means of flexion, with its greater diameter pointing to the oblique diameter opposite to that used by the biacromial diameter. However, it is not forced flexion and, therefore, the occipito-mental diameter is replaced with the suboccipito-frontal one (23).
– Stage eight: It marks shoulder release. The anterior shoulder is wedged under the symphysis pubis at the level of the acromion, while the posterior pushes the coccyx backwards. In this way, the posterior shoulder is released as a result of a lateral inflexion movement in antero-superior sense, similar to the movement that led to pelvic release. The anterior shoulder follows shortly afterward with a lateral inflection movement, but this time in an antero-inferior direction. At this point, the head has descended through the oblique diameter, traversing the different straits until it reaches the lower one (23).
– Stage nine: It refers to the seating of the head in the lower strait. Totally flexed, the head goes through an internal rotation motion so that the suboccipito-frontal diameter is placed in relation to the subsacral subpubic diameter. It is the fourth rotation, designed to place the occiput under the symphysis. However, if the chin becomes anterior, rotational dystocia will ensue, creating a difficult situation to solve (3). This set of movements is seen from the outside as external rotation of the shoulder, with the fetal dorsum looking upwards (23).

– Stage ten: Finally, the head is delivered. Localized in the retropubic space, the occiput acts as a fixed point around which the head makes a flexion and progression movement. The chin, the mouth, the nose and the forehead emerge slowly through the notch, until finally the occiput emerges under the symphysis pubis (23).

In work carried out in 1940, professor Peralta Cayón reported that spontaneous expulsion of the fetus is the rule in 69% of cases (24). Therefore, four significant differences between breech and cephalic vertex delivery need to be highlighted: engagement occurs in the lower and not the middle strait; there are ten stages instead of the six in vertex delivery, and the spontaneous course is less frequent than in vertex delivery (97%) (2, 24).

Intrapartum management of the mother with a breech presenting fetus

Breech delivery must be approached through the vaginal route when in the expulsive stage of labor with the fetal sacrum already beyond the lower pelvic strait, given that the risks of cesarean section are greater than its benefits at that point (5, 18). The need for a care team has been described when it comes to breech delivery. The team must include a practitioner in charge of attending to the delivery, one practitioner in charge of the neonate, one person to help with maneuvers and, finally, someone in charge of providing supplies (3, 25). The pregnant woman must have a patent venous access and blood type testing is needed given the risk of postpartum bleeding (21, 22).

In view of the lack of conclusive studies, the mother may be positioned either vertically or in lithotomy position (5, 6, 26) and, given the absence of sufficient evidence, assisting labor with oxytocin may be an option when uterine dynamics are not appropriate (1, 5, 18, 25). The Maternal Fetal Medicine Committee (MFMC) recommends avoiding amniorrhexis, offering pain management, monitoring fetal wellbeing (25), as well as monitoring adequate childbirth progression (5, 24).

On the other hand, descriptions point to the fact that episiotomy must be restrictive (1, 5) and that, if the cord is tightly streched, it is advisable to make a loop with it (15). The MFMC recommendations include abstaining from extracting or pulling the fetal body (5, 25) (Figure 2) because pulling on the lower limbs or the trunk disrupts the fetal cylinder and may cause head deflection or nuchal arm extension. It also recommends having warm sponges available in order to wrap the lower limbs of the fetus (25); likewise, staying calm and waiting wisely, reserving maneuvers for use only if needed (5). Finally, delayed clamping of the cord in breech presentation is recommended (27, 28).

Applicable obstetric maneuvers in breech delivery

Natural delivery forces are allowed to act freely until the lower angle of the fetal scapula comes into view. At that point, the head enters the lesser pelvis and impinges on the umbilical cord, compromising oxygenation, therefore creating the risk of asphyxia; however, the obstetrician has four minutes to complete fetal delivery (29-31). Despite this apparent urgency, the obstetrician must remember the predicament highlighted by Stockel, as cited by Schwarcz: "In breech presentation, fetal emergence had to be slow until the scapular angle came into view and then proceed rapidly until the mouth crossed the vulva, and then slow again until the head was out completely" (32). This last slowing down of the process is designed to avoid fetal injuries and tears in the birth canal (32).

The various maneuvers are classified as follows: those that help with the delivery of the arms and the head (i.e., Bracht's maneuver), the shoulders (i.e., Pajot, Rojas-Lowset), and the after-coming head (i.e., Mauriceau, Prague) (19, 29, 31).

Bracht's maneuver: Described in 1935 by Erich Bracht, a German obstetrician, this maneuver is the

only one designed to help with the simultaneous delivery of the shoulders and the head (30, 33). It is initiated when the lower angle of the fetal scapulae come into view in the vulva, after the second rotation and when the fetal dorsum is facing forward. At that point, the fetal thighs and trunk are clasped with both hands (the thumbs pressing the flexed thighs onto the abdomen and the remaining four fingers of each hand placed on the lumbosacral area) and they are lifted gently without pulling, thus delivering the arms (30, 33, 34). Then, the obstetrician brings the fetal buttocks and dorsum close to the maternal hypogastrium, thus achieving fetal delivery (30, 33).

For the Uruguayan school, this is a first-line maneuver because it slows the delivery process when the scapular girdle arrives at the vulvar plane. This consideration is probably based on the fact that it solves 60% of all vaginal deliveries with breech presentation (32). Bracht stated: "The art of waiting is a difficult one and not many obstetricians have the courage or patience to stand by doing nothing while breech deliveries occur spontaneously. This becomes even more difficult if the impatient obstetrician comes from a century of tradition and the teachings and writings of contemporary scholars" (35). Juan León, the celebrated professor of obstetrics, called Bracht the "champion of waiting" who established the basic principle for the care of this type of delivery (23).

Rojas maneuver: Described by Argentine professor Daniel Alberto Rojas in 1930 (29), it consists of taking the fetus by the thighs with the thumbs pressing on the sacrum, forcing it to rotate on its ventral plane so that the previously posterior shoulder will become anterior (Figure 3) while the corresponding arm moves just as revealed by the inferior angle of the scapula which comes into view under the pubic bone. With that, the obstetrician may finally grab the elbow and release the arm. Then comes a "retracing of steps"; the fetal sacrum is grabbed again bringing the now posterior shoulder back to the anterior position in a counter-rotation movement

Figure 2. Pulling and extracting the fetal body during labor must be avoided

of the fetus around its axis, delivering the second shoulder (29). This maneuver is also known in the Scandinavian school as Lovset's maneuver, from a publication dating back to 1937 (36).

Pajot's maneuver: It was described by Charles Pajot, professor of obstetrics at Paris University (9). The fetal body is lifted in order to pass the hand between the birth canal and the posterior shoulder, reaching the elbow so as to extract the upper limb by means of a motion in which the arm moves over the face (Figure 4). Then, the anterior arm is extracted using a similar procedure (9).

Prague maneuver: It was described by Prezos in 1573, but introduced into practice in 1846 by Kiwisch (29). It is performed after delivering the shoulders, when the fetal head is engaged (30). With the right hand, the obstetrician takes the baby's lower limbs, using the left hand to place the index and middle fingers like a fork on the neck (Figure 5) (31, 36). With both hands, the obstetrician pulls down to guide the occiput towards the symphysis (31) and then lifts the fetal body placing its back on the mother's belly. In order to ensure success with this maneuver, the downward traction must be stopped as soon as the occiput is placed under the symphysis pubis. It is useful to get the assistant to exercise pressure on the fetal head from the abdomen. The maneuver can also be performed with the fetal head in occipitosacral position, following a similar technique known as the inverted Prague maneuver (31, 36).

Mauriceau-Smellie-Veit maneuver: The purpose of this maneuver first described by Mauriceau in 1668, rediscovered by Smellie and incorporated definitively by Veit in 1863 in the Viena school, is to flex the fetal head to fit the lower strait in order to help with its delivery. It is performed when the head is already engaged in the anterior oblique or transvers occipitopubic position (30). The fetal body is saddled on the forearm corresponding to the hand that is introduced through the vagina; at the same time, the index and middle fingers of this same hand, with a volar orientation, slide along the fetal ventral plane towards the fetal mouth (Figure 6) to find support on the tongue base, trying not to engage the mandible or the floor of the mouth in order to avoid fetal accidents (30, 31, 33). It is because of these potential accidents that some

Figure 3. Rojas maneuver

Figure 4. Pajot's maneuver

authors prefer to apply pressure on the fetal face outside the mouth at the level of the malar eminences or the maxilla (37).

On the other hand, the index and middle fingers of the other hand, with the palm guided along the dorsal plane of the fetus, are positioned fork-like around the neck. The fingertips must rest on the sternum and not on the lateral aspect of the neck, avoiding as much as possible to use the fingers as hooks in order not to injure the supraclavicular neurovascular bundle (30, 31). Next, the two hands work simultaneously but playing different roles to maximize fetal head flexion with the help of the fingers that are already placed inside mouth (chin in contact with the sternum); the fetal head is rotated until the occiput is localized to the posterior aspect of the pubic bone, bringing the fetal head to the sacral concavity; (30, 31) the fetal head is delivered while keeping it well flexed and oriented along the anteroposterior diameter of the lower strait, applying slight traction downwards until the occiput comes into view under the symphysis pubis (30, 31). This traction is applied using the hand that is placed on the shoulders and not the one that is inside the fetal mouth (31). Finally, and only when the occiput is in view, the fetal body is lifted with the forearm supporting it pointing toward the maternal abdomen, and keeping the head in flexion (30, 31).

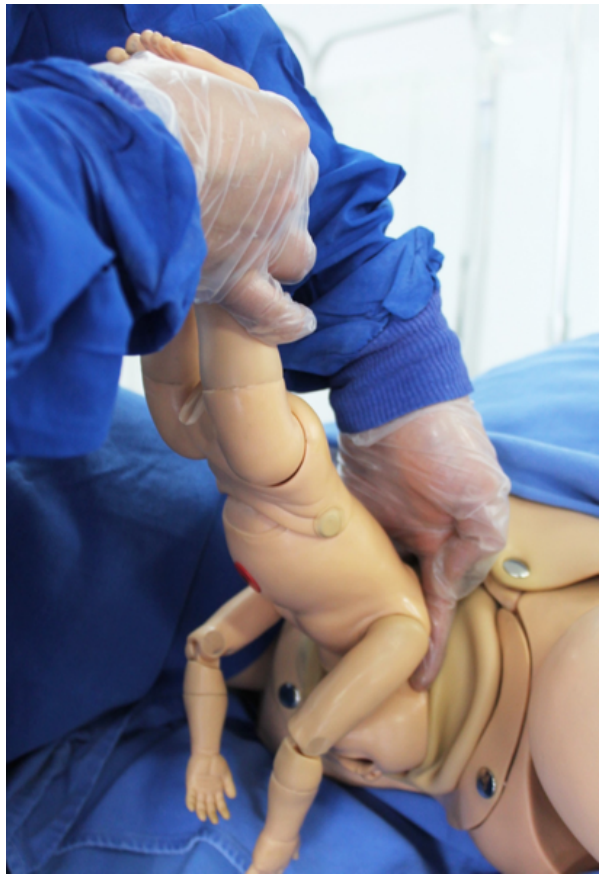

Figure 5. Prague maneuver

Figure 6. Mauriceau-Smellie-Veit maneuver

Some variations of this key classical maneuver have been described: the Arnot maneuver (used preferentially by one of the authors), in which the head flexion is achieved by placing the fingers on the maxilla on both sides of the nose, avoiding the outlet of the infraorbital nerves, and the Muñoz-Arbat maneuver in which the middle finger of the hand supported on the fetal neck exercises pressure on the occiput, flexing the head (37).

Finally, the clinician needs to know and master the management options to approach the delivery obstructed by after-coming head entrapment. In this regard, release using especially designed forceps (Piper, 1929), symphysiotomy, emergency cesarean section with fetal restitution into the uterine cavity (Zavanelly maneuver) and Dührssen incisions

(performed at 2, 6 and 10 o'clock, drawing a classical "Y" at the cervical level) when the obstruction corresponds to an edematous and rigid cervix, represent the final options for the management of this condition (1, 5, 19). If the shoulders have already been released spontaneously or by means of obstetric maneuvers such as the Rojas maneuver, then the maneuver to resort to is Mauriceau's; if the latter fails, Piper forceps should be used promptly (32). Resorting to force when applying the Mauriceau maneuver could be deleterious for the fetus. Let us remember Doderlein's postulate, as quoted by Schwarcz: "Application of the forceps to the after-coming head helped preserve more babies alive than the maneuvers themselves" (32).

CONCLUSIONS

The mechanism of childbirth in breech presentation is complex and requires knowledge of its physiology and multiple obstetric maneuvers that help ensure good maternal and perinatal outcomes, when there is no other care option.

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