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Mandibular Fracture in a Newborn From Birth Trauma: A Case Report

ABSTRACT

Objective: To report a case of mandibular fracture in a newborn presenting with post-delivery oral cavity bleeding and to discuss its etiology, clinical findings, diagnosis, management and outcome after treatment.

Methods:

Design: Case Report
Setting: Tertiary Government Training Hospital
Patient: One

Results: A newborn girl was referred for oral cavity bleeding after partial breech extraction. An intraoral hematoma and symphyseal step deformity on examination corresponded to a complete fracture of the symphysis and downward displacement of the left hemimandible on facial CT scans with 3D reconstruction. An uneventful closed reduction with external fixation using acrylic cap splint with circum-mandibular wiring was performed under general anesthesia and she was discharged feeding well. The cap splint and wires were removed after 4 weeks showing good facial symmetry and bone alignment. There were no complications on follow-up after 1 year.

Conclusion: Mandibular fracture can result from traumatic delivery and present with oral bleeding and hematoma. A thorough physical examination and workup should be done to assess for the sites involved. A multidisciplinary approach should be undertaken to provide the best possible care with the least invasive technique.

Keywords: *mandibular fracture; newborn; birth trauma*

Birth trauma from fetal manipulation during delivery accounts for less than 2% of neonatal deaths but it is still a major source of newborn morbidity with an average of 6 to 8 injuries per 1000 live births.[1] Risk factors include breech presentation, forceps delivery, vacuum extraction, macrosomia, prematurity and precipitous delivery.[2] Common injuries include laceration, asphyxia, cephalohematoma, soft tissue injuries, facial nerve palsy and a variety of fractures.[3] Among fractures, clavicular fracture is the most frequently reported injury followed by humerus, femur, skull fractures, and rarely, mandibular fractures.[4]

The incidence of mandibular fractures in infants aged 1 to 23 months are rare with frequency ranging from 0.9% to 2.6%.[5] They are even rarer in newborns (aged < 1 month) and premature infants (born before 37 weeks of gestation) with only nine reported cases in the English literature since 1949.[5] Out of the nine cases, six of these were due to birth trauma.[5-10]

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This report describes the presentation and management of what we believe is the first locally reported case of mandibular fracture in a newborn from birth trauma.

CASE REPORT

A newborn girl weighing 2580 gm. was referred for oral bleeding following partial breech extraction. Upon delivery she had a low APGAR scores of 3, 4, 6, and crackles were heard over both lung fields, necessitating orotracheal intubation and mechanical ventilation. On examination, there was hematoma on the floor of the mouth with displacement of the symphysis. *(Figure 1A)* An orogastric tube was inserted and feeding was started. A modified Barton bandage using a 2-inch elastic bandage was applied to stabilize the mandible *(Figure 1B)* and antibiotic therapy was initiated. An initial skeletal survey revealed a displaced fracture along the symphysis. On the 5th hospital day, pneumonia had resolved and the patient underwent Facial CT scan with 3D Reconstruction under IV sedation showing complete fracture at the symphysis with concomitant downward displacement of the left mandible. *(Figure 1C)* She was then referred to the dental service for fabrication and fitting of an acrylic cap and a custom-made acrylic impression tray was fabricated over this model. *(Figure 2A)* On the 10th hospital day, closed reduction with external fixation using acrylic cap splint with circum-mandibular wiring with G26 dental wire was performed under general anesthesia. *(Figure 2B)* A gauge 21 needle was introduced through a small stab incision at the inferior border of the mandible and the needle was guided along the body of the mandible and passed out lingually. The gauge 26 wire was inserted through the needle up to the oral cavity, and the needle was retracted and redirected to the buccal sulcus where the other end of the wire was inserted. The acrylic cap splint was stabilized by winding the wire on both sides. Bony sequestrae were removed with care so as not to damage the tooth buds. The patient was then started on bottle feeding three 3 days after surgery and was discharged after 11 days. One week follow-up at the out-patient department was uneventful.

After 4 weeks, repeat x-ray of the mandible showed good union with dental wires in place keeping the previously visualized fracture in anatomical alignment. *(Figure 2C)* The patient was readmitted for removal of the cap splint and wires under general anesthesia. During surgery, no mobility was elicited along the fracture line and the alveolar ridges were parallel and symmetric.

She was followed-up monthly until 1 year. Teeth eruption was noted *(Figure 3A)* and a follow-up radiograph also revealed good bone deposition and formation of tooth buds. *(Figure 3B)* She was feeding well and gaining weight satisfactorily with no facial asymmetry. *(Figure 3C)*

Figure 1 A. Pre-operative view of the oral cavity showing hematoma on the floor of the mouth with displacement of the symphysis; **B.** Application of modified Barton bandage using elastic bandage; and **C.** Facial CT scan with 3D Reconstruction in anterior view shows fracture at the mandibular symphysis with downward displacement of the left mandible.

Figure 2 A. Acrylic cap splint fabricated; **B.** Closed reduction with external fixation using acrylic cap splint with circum-mandibular wiring using G26 dental wire; and **C.** Mandible x-ray 4 weeks postoperatively.

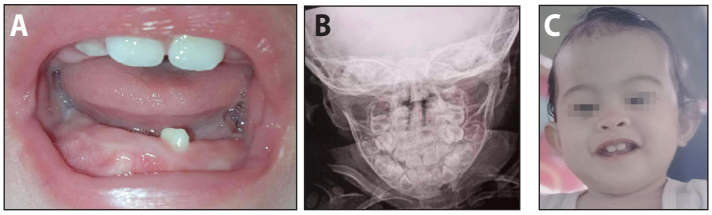

Figure 3. One year follow up showing **A.** tooth eruption; **B.** radiograph with good bone deposition and tooth buds; and **C.** patient thriving with successful union of the mandible and no facial asymmetry.

DISCUSSION

We reported a rare case of mandibular symphyseal fracture in a newborn following partial breech extraction. According to the literature, birth trauma remains the most common cause and the symphysis is the most frequently reported site of mandibular fracture.[5,10] Other etiologic factors include accidental falls, road traffic accidents and attempted infanticide.[9]

The clinical signs of mandibular fractures in newborns are almost similar to those in adults. These include facial swelling and disfigurement, step deformity, laceration or hematoma on the floor of the mouth and on the alveolar ridge, as well as mobility and crepitation of the fractured segments, although these may not be evident in every case.[11] Our patient presented with hematoma on the floor of the mouth and displacement of the symphysis.

Compared with adults, performing a thorough physical examination on neonatal patients is difficult since they are normally uncooperative and have very small oral cavities; hence, imaging is essential for diagnosis and planning the management.[4] One of the most useful imaging techniques for evaluating the mandible is the orthopantomogram (OPG) which is a panoramic single image radiograph of the mandible,

maxilla and teeth.[11] It provides a convenient, inexpensive and rapid way to evaluate the gross anatomy of the jaws, however, is impossible to use in young, injured or hemodynamically unstable patients. An alternative to the OPG is the mandible series, a plain x-ray series composed of posteroanterior view, Towne's view and right and left lateral oblique views, allowing visualization of all portions of the mandible.[11] The main weakness of this series, though, is poor visualization of the symphyseal region due to overlap of the cervical spine. Another very useful radiographic evaluation which allows visualization of the mandible in all 3 planes of space is a computed tomographic (CT) scan; however doing this on a newborn requires a lot of preparation since they need to be sedated by an anesthesiologist during the procedure. In addition, a CT scan is quite expensive and is not readily available in every center. Our patient first underwent a skeletal survey post-intubation to document the fracture, and once she was stable, a facial CT scan with 3D reconstruction was requested, being the imaging modality of choice for neonatal fractures.[12] This confirmed the complete fracture of the mandibular symphysis with downward displacement of the left mandible.

Planning for surgical approach in newborns involves peculiar and challenging problems not encountered in other age groups such as the demand for breastfeeding.[4] But the main goal of management is the same – restoration of both the function and form which have important roles in future facial development.[13] The reconstruction of pediatric facial fractures particularly mandibular fractures requires an understanding of craniofacial development and the consequences of injury on further growth.[11] Appropriate treatment will depend on the age of the patient, location and the nature of the fracture.[11] Open reduction with internal fixation (ORIF) by using either absorbable or titanium plates has always been controversial in growing patients, hence it is usually reserved for difficult fractures when three-dimensional control is required.[12] On the other hand, conservative management is preferred in cases of non-displaced fractures and is mostly preferred in pediatric patients.

One of the conservative or noninvasive approaches to mandibular fractures in neonates that is used with great success involves mandibular fixation using an acrylic splint secured by circum-mandibular wiring.[10,13]

The main advantage of this closed reduction aside from a smaller incision is the absence of injuries to the tooth buds and the maintenance of final mandibular growth.[4] On the other hand, its disadvantages especially in children are that gingival tissues can be easily lacerated while performing fixation; the mandibular acrylic splint does little to control a significantly displaced fracture of the symphysis; and, there is a need for re-admission for removal of the splint and wires.[11] The duration of immobilization for sufficient proper bony union is also important.[11] A number of factors should be considered including the speed at which fractures heal in children of various ages, the complexity of the fracture and the presence of concomitant injury.[16] Generally, 2-3 weeks of immobilization for children <12 years old and 3-4 weeks of immobilization for children >12 years old is sufficient.[11,12]

Challenges in treating mandibular fractures both in adults and newborns include the possibility of producing long-term complications such as ankylosis, growth disturbance, malunion or malocclusion and dental injury.[14] However, due to newborns' greater regenerative potential and their capacity for dental compensation, complications are less compared to adults.[14]

Our patient is now one year old with good bone deposition and tooth eruption. No facial asymmetry was noted on succeeding follow-ups and she was feeding well and gaining weight satisfactorily. As Kaban and coworkers stated, the simplest treatment is usually the most satisfactory one, and complications are more likely to occur from overzealous therapy of mandibular fractures in children than from conservative therapy.[15]

In conclusion, mandibular fracture can result from traumatic delivery and present with oral bleeding and hematoma. A thorough physical examination and workup should be done to assess for the sites involved. A multidisciplinary approach should be undertaken to provide the best possible care with the least invasive technique.

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