



# A Rare Case Report of a Consecutive Rib Fractures as an Isolated Obstetrical Complication

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## Abstract

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**AIM:** The aim of the following paper is to present the case of a term neonate with consecutive posterior rib fractures as an isolated finding after birth.

**METHODS:** In the medical literature, there have been reported some sporadic cases indicating rib fractures in neonates. We present literature review and report a rare case of consecutive posterior rib fractures in neonate born following an uneventful pregnancy and uncomplicated labor.

**MAIN FINDING:** The most common factors that can lead to rib fractures are birth trauma, cardiopulmonary resuscitation, and underlying disorders influencing bone development. In the presented case, there were no signs of other bone fractures or systems involved.

**CONCLUSION:** Isolated form of consecutive posterior rib fracture after birth is a rare obstetrical complication. It is most likely caused by birth trauma but should be interpreted as a clinical sign of the potential syndrome. A decision whether to perform an X-ray depends on a physical examination of the newborn within the 1<sup>st</sup> h of life.

## Introduction

Rib fractures during neonatal period are rare with incidents of fractures in premature neonates between 1.2% and 10.5% [1]. The most common factors that can lead to rib fractures are birth trauma, cardiopulmonary resuscitation, and underlying disorders influencing bone development [2], [3]. In the medical literature, there have been reported some sporadic cases indicating rib fractures in neonates after birth. The neonates in those cases were large with a difficult delivery, while more than half of them exhibited shoulder dystocia [3]. As mentioned before, underlying disorders influencing bone development, for example, osteogenesis imperfecta (OI), the most important disorder, contribute to this proportion [2], [4].

When a neonate is presented with rib fractures, it is mandatory to exclude metabolic diseases using laboratory tests to measure calcium, alkaline phosphatase, Vitamin D, Parathormone, and phosphorus levels. If neonate presents with multiple rib fractures, the OI is the first disorder that should be taken in consideration, especially if there are other OI signs present [4]. Molecular testing by DNA sequence analysis provides a definitive diagnosis [5].

## Case Report

A female neonate was born at 41 weeks of gestation following an uneventful pregnancy by a healthy 32-year-old mother. Mother had no history of medical problems and had one previous pregnancy which resulted in a liveborn and healthy infant. During the regular antenatal screening, hypothyroidism was diagnosed in the first trimester of pregnancy. Mother began levothyroxine therapy and the thyroid hormones values returned to normal after a few weeks. Following regular glycemic controls, mother gained 16 kg during the pregnancy. Routine prenatal sonographic screening examinations were normal. Genetic screening tests found no chromosomal abnormalities. After the spontaneous rupture of membranes, labor was augmented with oxytocin infusion and the epidural analgesia was administered. A mediolateral episiotomy was performed and neonate was delivered vaginally by the expulsion of head and shoulders with ease, weighing 3770 g (60<sup>th</sup> centile) with Apgar scores of 9 and 10 at 1 and 5 min, respectively.

At the age of 5 h, neonate became tachypneic with a respiratory rate of 70/min, however, with no signs of dyspnea nor the need for supplemental oxygen. Newborns heart rate was 135 beats/min. Skin appeared

plethoric with no rash or signs of active bleeding. During the examination, neonate responded with crying.

Dysmorphic features were not present in clinical appearance. The sclera was markedly blue. Head circumference was 34 cm (10<sup>th</sup> centile, Z score - 1.3), and the anterior fontanelle was 1 × 1 cm wide. Passive movements of his neck were normal, while the clavicles appeared to be intact. The thorax was symmetrically shaped. During the auscultation, air entry was reduced on the right side of chest with marked crepitations. Subcutaneous emphysema was palpable below the lower margin of the right scapula. Cardiovascular and abdominal examinations were unremarkable. No abnormalities of extremities were noticed. The neurological examination was normal. Neonate was transferred to the neonatal unit and a chest radiograph was taken.

Chest radiograph immediately after birth showed fractures of the 5<sup>th</sup>–8<sup>th</sup> mid posterior ribs with no signs of pneumothorax nor pleural effusion (Figure 1).

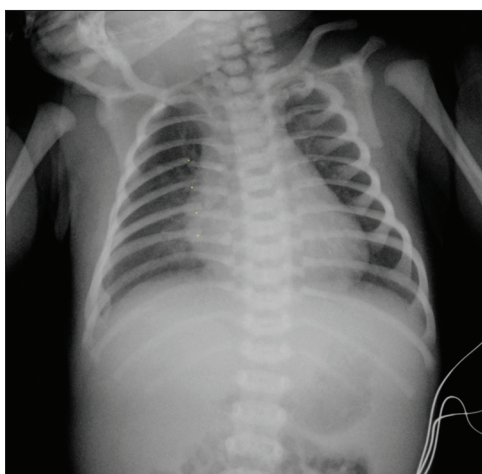


Figure 1: Consecutive rib fractures of right hemithorax. \*-\* rib fracture

No signs of clavicular fractures were evident. Serum levels of calcium, alkaline phosphatase, and phosphorus were normal.

Newborn was treated conservatively which included immobilization of chest wall and treatment with analgesics to relieve the pain. Throughout the treatment, there was no sign of respiratory insufficiency nor need for a respiratory therapy of any kind.

On the last follow-up, at the age of 8 months, the patient had any delay in somatic development.

## Discussion

Bone fractures as an obstetrical complication are often associated with different types of fetal trauma caused by assisted vaginal delivery or shoulder dystocia.

Fractures are typically asymptomatic and often found accidentally during radiological workup [1]. Neonates specifically prone to bone fractures are those with the metabolic bone disease of prematurity or OI. OI, one of the most common causes of multiple fractures in neonates, is an inherited disorder of collagen Type 1, which results in varying degrees of osteoporosis, bone fragility and has the predisposition to fractures. Type 1 and type 4 are autosomal dominant, Type 3 is either autosomal dominant or autosomal recessive. In perinatal period, Type 2 of OI is often fatal and can be detected prenatally [5].

In the presented case of term neonate, family history was negative for inherited bone diseases or evidence of accidental parental fractures. Tachypnea could be a consequence either of pain or a transient tachypnea of the newborn. Except of blue sclera, secondary characteristics of OI such as dentinogenesis imperfecta or Wormian bones could not be assessed in our patient. However, blue sclera is common findings in some of healthy newborns. Normal morphology of patient's head, as well as normal skin, abdominal, and osteomuscular examination excludes the possibility of OI.

Most of the studies observed several risk factors that are often associated with higher risk of birth fracture in newborns. These include fetal macrosomia, assisted vaginal delivery, meconium-stained amniotic fluid, nurse attendant, and shoulder dystocia [6]. These results were confirmed by an extensive Dutch study which found that neonates with rib fractures related to birth trauma were large for gestational age with difficulties in delivery presented as shoulder dystocia. None of the above-mentioned factors were present in our case [7]. In terms of the mode of delivery, there is no evidence that cesarean section decreases the risk of fractures nor affects mortality rate [8]. Reported fractures affected upper and lower limbs, vertebra, and skull [7].

The above-mentioned fractures as well as bone bowing or osteoporosis were not present in our case. In the recently published studies, rib fractures related to birth trauma are often described in association with clavicular fractures which are commonly located ipsilateral to the rib fractures [4]. Due to the lack of clinical or radiological abnormalities or sufficient evidence of bone dysplasia, further genetic testing for OI was not performed. The cause of tachypnea in this newborn is most likely the combination of pain and instability of right hemithorax, due to the rib fractures or the transient tachypnea that is common during the first 3 days in newborns.

Based on clinical experience, isolated form of a rib fracture in the presented case is a rare finding and should be interpreted as a clinical sign of potential syndromes such as OI and metabolic bone disease, or some rare syndromes such as Cole-Carpenter, Bruck, and McCune-Albright [9]. A decision whether to perform an X-ray depends on a physical examination of the newborn within the 1<sup>st</sup> h of life.

## Conclusion

Isolated form of consecutive posterior rib fracture after birth is a rare obstetrical complication. It is most likely caused by birth trauma but should be interpreted as a clinical sign of potential syndrome. A decision whether to perform an X-ray depends on a physical examination of the newborn within the 1<sup>st</sup> hours of life.

## Ethical Standards Statements

All procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1975, as revised in 2008.

## Statement of Informed Consent

Informed consent was obtained from parent of a patient for being included in the study.

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