Bizarre Parosteal Osteochondromatous Proliferation (Nora’s lesion) with Translocation t(1;17)(q32;q21): a Case report and Role of Cytogenetic Studies on Diagnosis

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Abstract. Bizarre Parosteal Osteochondromatous Proliferation (BPOP) is a benign tumor-like lesion that has recently been reported to have an association with a specific translocation t(1:17)(q32;q21)[1]. Like other reactive periosteal lesions, BPOP can be diagnostically challenging, with the ever-present possibility of a potentially devastating erroneous diagnosis of malignancy. These lesions are often clinically, radiologically and histopathologically ambiguous, with rapid but circumscribed, non-infiltrative growth patterns, and histological atypia, but without overt features of malignancy. However, recent published reports have better characterized radiological [2] as well as histological features that aid in making an accurate diagnosis. In spite of all these advances, one of the biggest challenges in making the correct diagnosis still remains the inexperience of the practicing pathologist with this lesion, simply due to its rarity. We present a case of Nora’s lesion in the distal ulna of an 8 year-old girl, in which, besides the histological features, we were able to demonstrate the translocation t(1:17)(q32;q21). Thus, we would like to emphasize the utility of cytogenetic studies in the correct and rapid diagnosis of clinically and radiologically ambiguous periosteal-based lesion.

Clinical history
An 8 year-old girl presented with a painless distal right ulnar mass. Other than this lesion, she was healthy and had no other complaints. There was no history of trauma in the region. The patient underwent local resection of the tumor, and the mass was noted to peel off easily from the ulnar periosteum, with intact underlying bony cortex. Within the next few months, the growth recurred, and the patient returned for re-excision three month later. Material was submitted for pathology from both the original excision as well as the re-excision. Material was also submitted for cytogenetics during the original excision. The patient’s recovery has been uneventful, and currently she is asymptomatic.

Gross and microscopic findings
Both resections yielded fragments of tan bony tissue that measured 2.0 x 0.9 x 0.5 cm in aggregate from the first excision and approximately 1.5 x 1.0 x 0.7 cm in aggregate from the re-excision. Microscopic examination of the original excision showed a proliferation of cartilage with focal myxoid areas (figure 1 A). Chondrocytes were enlarged, with occasionally prominent nucleoli (figure 1 B). Focal endochondral ossification was noted. There was an adjacent area of proliferation, composed of bland-looking spindle cells; this area also contained foci of woven bone. Occasional osteoblastic rimming was noted. There were no atypical osteoblasts. A pathological diagnosis of a benign osteocartilaginous proliferation was rendered. Microscopic examination of the re-excised lesion showed a well-defined, somewhat nodular osteocartilaginous mass. The outermost layer consisted of dense fibrotic periosteum, overlying a distinct cap of cartilage. The hyaline cartilage was slightly hypercellular. The chondrocytes appeared reactive, with slightly enlarged plump nuclei, similar to those in the original excision. No significant atypia or mitotic figures were identified in the cartilaginous cap. Beneath the cartilage cap were osteocartilaginous trabeculae undergoing active endochondral ossification. The trabeculae were rimmed by plump prominent osteoblasts with amphophilic cytoplasm and round vesicular nuclei. The stroma interspersed between
the trabeculae (figure 1 C) was made of hypercellular fibrous tissue with bland elongated nuclei. Scattered multinucleated osteoclast-like giant cells were seen, as were areas of acute hemorrhage. There was no necrosis or atypical mitotic figures.

With these histomorphological findings, supported by cytogenetic detection of the translocation t(1:17) (q32;q21) in the original excision, a diagnosis of Bizarre Parosteal Osteochondromatous Proliferation (Nora’s lesion) was rendered.

Discussion

Since the original description of Bizarre Parosteal Osteochondromatous Proliferation (Nora’s lesion) in 1983 by Nora et al [3], the lesion has gradually been recognized and diagnosed more frequently. Still, the lesion is very rare, and only a few large series have been published, including the original 35 cases published by Nora et al[3] in 1983, another 65 cases published by Meneses et al[4] in 1993, 12 cases by Abramovic and Steiner[5] in 2002, and most recently 24 cases by Dhondt et al[2] in 2006. Other publications on this entity have been isolated case reports [6] and much shorter series [7]. The lesion affects patients of any age; the age range is wide, from 8 years to 73 years [4] with no sex predilection [6]. This lesion occurs mostly in young adults but occasionally in other age groups as well. It most commonly involves the tubular bones of the hands and feet with the hands 4 times more commonly affected than the feet [7]. Proximal phalanges are more commonly affected than distal ones [3]. Recently, Nora’s lesion has been reported to also occur in long bones [4, 8, 9, 10], one case has been reported in the proximal aspect of humerus [11]. This is a benign lesion, but often confused with malignancy, due to its tendency to grow rapidly, frequent recurrences and somewhat atypical histological appearance, hence of great interest and importance to pathologists, who bear the burden of making the final diagnosis. Recurrences occur quickly after excision, with the average interval between first excision and first local relapse reported to vary between 2 months and 2 years, while the time between second and subsequent excisions ranges from 3 to 13 years [4].

Many other periosteal-based reactive proliferations have clinical and pathological features that overlap those of BPOP. Having made the first step of correctly diagnosing this lesion as a benign entity, and having avoided the “malignant” pitfall, the potential list of differential diagnoses is still long. The discovery [1] of a specific translocation t(1:17)(q32;q21) and recurrent breakpoints, including splits in 1q32 with or without split in 17q2 in BPOP was published by Nilsson et al in 2004. In our case, we were able to demonstrate the t(1:17)(q32;q21) translocation, which was invaluable in making a definite diagnosis of BPOP. One case report by Teoh et al [6] showed a novel chromosomal aberration with pericentric inversion of chromosome 6 between 6p25 and 6q15 and paracentric inversion of the long (q) arm of chromosome 7. Zambarano et al [12] reported two cases with different chromosomal aberration.

The histological features of Nora’s lesion, although somewhat characteristic when considered in isolation, do overlap with several other reactive periosteal and benign timorous conditions, such as subungual exostosis, osteochondroma, florid reactive periostitis, fibro-osseous pseudotumor and myositis osificans. Also, the radiological and clini-
Nora’s lesion with t(1;17)(q32;q21)

In its classic presentation in intact resection specimens, Nora’s lesion shows a somewhat polypoid, well defined firm, tan-white mass ranging from 0.5 cm to 2 cm. They are either loosely or firmly attached to the underlying cortex, and can often be shelled out or peeled off the cortex with relative ease. Under the microscope, the outermost layer is periosteum, under which there is a cartilaginous cap composed of hypercellular, reactive or somewhat atypical looking cartilage. The chondrocytes appear plump and active, with frequent binucleation. Under this cap of cartilage is a zone of endochondral ossification and trabeculae of woven bone, rimmed with osteoblasts. The stroma in between the trabeculae and in the periosteum is made of fibroblasts and is fairly hypercellular, arranged in intersecting fascicles; mitotic activity may be brisk, but never atypical. When received in several tiny fragments, or as a result of several excisions and re-excisions, this histomorphology may be disrupted or atypical enough to be truly confounding and challenging.

The treatment and prognosis of BPOP is fairly simple. Wide surgical excision is curative. Recurrences are still treated with excision. To our knowledge, there has been only one report in the literature about fibrosarcoma in BPOP [13], and the diagnosis of this case was not supported by cytogentic data. No other case of malignant transformation or malignant behavior has been reported in the literature, and this phenomenon seems to be the exception rather than the rule.

In summary, periosteal reactive lesions can be diagnostically challenging, especially when the clinical course is aggressive, and the histological appearance atypical. The diagnosis of these lesions can be greatly aided by submitting tissue for cytogentic studies, and this can help in cutting down time and resources spent on attempting to reach the diagnosis. In our opinion, this also will aid in further characterizing BPOP and other periosteal proliferations. The infrequency of these lesions in the general pathology practice makes ancillary studies such as molecular and cytogentic aid invaluable.

Acknowledgement

We would like to thank Ganna Boryshpol (13503 Mooring Pointe Dr., Pearland, TX 77584) for her help and expertise in editing of this paper.

References

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