Case Reports

Pregnancy - associated osteoporosis fact or fantasy?

Mona Fouda, MBBS, MRCP, Wasil Jastaniyah, MBBS.

ABSTRACT

Gestational osteoporosis is a controversial entity in endocrinology. It is supported by many reports in the literature but many doubt its existence. Here we report two young Saudi ladies who could fit very well into this category and we give a brief review of the literature of this enigmatic disease.

Keywords: Osteoporosis, gestational.


The onset of apparently idiopathic osteoporosis during pregnancy is an important clinical problem. Since the first report by Nordin and Roper (1955), there have been several reports of isolated cases, and in many of them this form of osteoporosis was considered as a rare entity while in others the existence of such a condition was questioned. Recent papers have suggested that this entity is not so uncommon and considered it as an important clinical problem. We report here the clinical features and investigations of two young Saudi females with osteoporosis related to pregnancy to add to the number of isolated cases reported and to emphasize that such a condition exists. Literature was reviewed on this topic and we attempt to compare between reported cases to reach a better understanding of the natural history and outcome in this disorder.

Patient 1. The first patient was a 29 year old Saudi woman not known to have any medical illness who presented 3 months after delivery of her third child with history of severe mid and lower back pain limiting her daily activity and radiating sometimes to the right or left knee. The pain started during delivery of her last baby and was very severe after delivery to the degree that she cannot sit from a supine position or carry very light objects. The pain improved spontaneously two months after delivery and became very mild and occurring at night only. Her pregnancy was uneventful and she gave birth to a healthy child. She breast fed soon after delivery and continued breast feeding. Her daily intake of milk and dairy products before and during pregnancy was very poor but she claims that after the onset of pain she improved her intake of milk and dairy products and she was keen to ingest milk very frequently and she relates the improvement in her symptoms to the frequent ingestion of milk. She is an educated Saudi housewife married for the past 6 years with 3 healthy children and a history of one abortion. Her sun exposure is minimal. She had no history of diarrhea, lifting heavy objects, raw milk ingestion or contact with TB patients. She is a sibling of eight brothers and sister. There is no history of bone disease in the family or history of repeated fractures except for one sibling who had a history of fracture two times after a significant fall and trauma. Physical examination

From the Department of Medicine, King Khalid University Hospital, Riyadh, Saudi Arabia.

Received November 1997. Accepted for publication in final form December 1997.

Address correspondence and reprint request to: Dr. Mona Fouda, Department of Medicine (38) King Khalid University Hospital, P.O. Box 2925, Riyadh 11461 Saudi Arabia.
revealed a healthy young woman with no apparent musculoskeletal deformities, with full range of movement of all joints and CNS examination was normal. Biochemical and hormonal investigations were normal with normal bone profile, full blood count and liver function test as well as thyroid function test and prolactin level. The level of 25 vit D3 was low of <10 ng/ml (20-120). Radiological investigations including X-ray of the spine, CT-scan, bone scan and DXA scan were done and revealed severe generalized osteopenia with scoliosis (T12 - L1, 7°), compression of T6, vertebra, and increase tracer uptake on bone scan in the lumbar spine as well as focal uptake in one of the left metatarsal bones suggestive of a fracture. The patient was discharged pain free with the impression of pregnancy related osteoporosis and was started on calcium and vit D to be followed up later in the clinic.

Patient 2. The second patient was a 27 year old Saudi female referred to the metabolic bone diseases clinic with history of left hip pain for two years since her last pregnancy. She used to have similar pain in previous pregnancies but milder and would disappear soon after delivery. She is P_e10 has reasonable history of dairy products intake and sun exposure. No chronic illnesses or medications and no significant diseases in the family. Examination was unremarkable. She had osteopenia on plain lumbar spine x-ray and a DEXA scan revealed severe osteoporosis. Bone scan was normal. Biochemical and hormonal analysis including a bone profile, full blood count, liver function test, thyroid function test prolactin and PTH were all normal. Vit D level was low of 20.22 nmol/L (33.7 - 92.6). The lady was started on Calcium and vit D supplement and a diagnosis of gestational osteoporosis entertained.

Discussion. Many hormonal changes occur during the critical stage of child bearing which could affect the expecting mother negatively. Gestational diabetes mellitus and gestational thyrotoxicosis are but two of such entities which are well described and properly understood. Gestational osteoporosis on the other hand remains debatable.

The etiology and pathogenesis are obscure and confusing with many hypothesis postulated in different studies. Pitkin et al 1979, Conforti 1980 and Cundy and Kanis 1981 have claimed that the influence of the regulatory hormones in protecting the maternal skeleton during pregnancy may not be significant and that the level of calcitonin is higher, if at all, only in the first part of pregnancy but drops uniformly in the later part helping to release calcium from the maternal skeleton during the critical period of fetal ossification.13,6,7

Early reports have suggested that mechanical compression of the obturator nerve or obstruction to the venous return by the fetal head resulted in selective demineralization but Bealieu et al in 1976 had stated that idiopathic osteoporosis of the hip has also been reported both in men and non-pregnant women.8 In 1988 Chigara et al disclaimed the theory based on pressure on the obturator nerve by the fetus leading to osteoporosis and suggested that a rapid change in relevant hormonal chemical factors may be responsible which improves rapidly after pregnancy.4

Smith et al in 1985 proposed that there might be a transient failure of the usual changes in calcitropic hormones to prepare the maternal skeleton for the stress of childbirth which might lead to this problem, supporting this was the finding of low levels of vit D3 and failure of a rise in calcitonin observed in these patients.

Cole et al in 1987 and Rodin et al in 1989 claimed that the increase calcium demand in the last trimester of pregnancy is not met by increased intestinal absorption leading to bone resorption. They have also shown that the markers of bone metabolism suggest reduced bone turnover during early pregnancy with a rebound increase in the third trimester and a further increase in lactating women.5,4

In 1991 Drinkwater and Chesnut in their prospective study during pregnancy suggested a change in bone density secondary to alternation in mechanical stress due to weight gain, change in posture and diminished activity in addition to the increase in need for calcium.8 Garner et al same year performed qualitative bone histomorphometry in women with osteoporosis in pregnancy and lactation and failed to demonstrate the typical high bone turnover that is seen in juvenile or post menopausal osteoporosis and concluded that the changes are just extreme changes of the normal physiological events occurring during pregnancy and lactation.10 In 1993 Dunne et al proposed a genetic factor for this entity9 and reported the biggest series of 29 cases of pregnancy associated osteoporosis.

Blanch et al in 1994 stressed the importance of calcium metabolism in pregnancy in relation to this pathology and concluded that normal calcium loss in pregnancy may be detrimental in women with pre-existing low bone mass triggering the manifestation of the osteoporosis syndrome.3

The role of lactation in the pathogenesis of this entity is again very controversial. Gruber et al 1984 and Smith et al 1985 have reported that lactation is not a major influence on etiology, since osteoporosis can occur even in the absence of lactation and often before lactation can be implicated. However, continued lactation after initiation of the problem might worsen the symptoms with a further reduction in the bone density which later improves after weaning.11,16 Koetting and Wardlaw also showed that bone loss during lactation can be corrected by normal physiological processes without any long term detrimental effect.12
Smith et al in 1995 proposed that the disease might be related to a particular pregnancy (and possibly a particular fetus) as there is rapid clinical improvement after a specific pregnancy with evidence of subsequent bone recovery and non-occurrence in subsequent pregnancies.\textsuperscript{15}

Age at presentation in the reported cases ranged from 21-36. Symptoms occurred most often in the first pregnancy but in some it began in the second or third pregnancy after an uneventful first pregnancy. Most patients had no risk factors or obvious cause for osteoporosis additional to pregnancy except for few reported by Smith et al 1995.\textsuperscript{15} The unavailability of radiographic studies prior to pregnancy is a limiting factor in deciding if the pregnancy alone is the culprit or are there additional factors that contribute to this disorder. Only one patient reported by Blanch et al 1994 had a previous x-ray and 16 years of age which showed no evidence of osteopenia.\textsuperscript{2}

The most frequent symptom is severe back pain often with recognized loss of height occurring before or after delivery. Less common was pain in the hip or groin or pain in ankles. Biochemically the bone profile is normal, and radiographically there is severe osteopenia with vertebral compression in those presenting with low back pain and bone scan may show impending fractures in other sites of the body.

Spontaneous recovery is the rule in most if not all patients and some patients when they were followed up showed partial improvement in bone mineral density (BMD).\textsuperscript{3,15} Calcium supplementation with or without additional therapy e.g. vit D, or bisphosphonate has been used in certain patients with clinical improvement.

Whether to advise the patient to stop breast feeding is an area of controversy but so far lactation is not been proven to have significant clinical effect on bone mass. However, continued lactation after the initiation of the problem might worsen the symptoms with a further reduction in the bone density which later improves after weaning (Gruber et al, Smith et al).\textsuperscript{11,16} In our patient the symptoms improved despite continued breast feeding.

In summary, pregnancy associated osteoporosis is not uncommon. Confusion about pathogenesis still remains. Postpartum osteoporosis is not progressive. There is controversy over whether these patients have pre-existing low bone density sufficient to lead to structural failure during pregnancy, or whether the pregnancy itself is the cause of osteoporosis. It is probably multifunctional in origin with failure of the calcitropic hormones to meet the increased demand in pregnancy and lactation imposed on the mother by the growing fetus, and her own body requirements which probably is more detrimental in mothers with pre-existing critical bone mass that would go unnoticed if not for the acute demands of pregnancy. Further pregnancies need not be contraindicated. BMD monitoring is required to assess future fracture risk, and until now lactation is not known to have a significant clinical effect on bone mass. Vitamins, minerals and exercise may help in partially improving the condition.

Acknowledgment. To Ms. Miriam Gozo Culanding who gave excellent secretarial assistance in preparing this manuscript.

References