

CASE REPORT

QUALITY OF LIFE EVALUATION IN CHILDREN WITH OSTEOGENESIS IMPERFECTA AFTER GIVING BISPHOSPHONATE INFUSION IN DR. SOETOMO HOSPITAL SURABAYA

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ABSTRACT

Background: Osteogenesis imperfecta (OI) or brittle bone disease is a connective tissue formation disorder. Clinical symptoms vary greatly between patients even in the same type. The lack of evaluation of the effect of bisphosphonate on the quality of life of pediatric patients is the main reason for the authors to evaluate the quality of life in pediatric patients with Osteogenesis imperfecta in Soetomo Academic General Hospital. **Method:** We selected three cases of OI from an outpatient clinic who was given the management of bisphosphonate administration. Then compared before giving Bisphosphonate and after giving bisphosphonate for 1.5 years and evaluated using the SF36 questionnaire and DASH score. **Results:** From the results of SF36 evaluation in evaluating the quality of patients's life with OI after administration of bisphosphonate has showed a improvement quality of life than compared to before administration of bisphosphonate. **Discussion:** From the evaluation results using the DASH score, all three patients had a good development in terms of motor development in upper extremities. From the points of Emotional Health and Social Attitude, it can be concluded that patients are bolder to move and move more than before. Before giving bisphosphonate, according to anamnesis from parents, patients are relatively afraid to move, after giving bisphosphonate the patient is more willing to move and play with the surrounding environment. From the evaluation of Pain points, there is a significant difference between post and before bisphosphonate administration, this may be due to the reduced frequency of fractures compared to after administration of bisphosphonate. The goal of rehabilitation in OI patients is primarily to improve joint motion and muscle strength, as well as to improve ambulation and functional ability. **Conclusion:** Significant effects were seen after bisphosphonate administration. The need for a thorough evaluation of the effects of bisphosphonate administration on pediatric. Osteogenesis Imperfecta patients. The need for a standard and specific questionnaire for the evaluation of the development of bisphosphonate therapy in patients with Osteogenesis Imperfecta.

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INTRODUCTION

Osteogenesis imperfecta (OI) or brittle bone disease is a connective tissue formation disorder that is generally characterized by bone fragility, osteopenia, blue sclera, dentinogenesis imperfecta (DI), and hearing loss. Fractures and deformities in the bone often occur although caused by minor trauma (1)

The diagnosis of OI is based on a family history of the disease and the clinical manifestations that appear vary by patient, from mild to severe types, therefore OI requires multidisciplinary treatment. OI management is often not optimal, due to lack of knowledge of this disease which is still lacking as well as

medical costs are high. In addition, researchers still rarely evaluate therapy in OI (2).

Intravenous therapy with bisphosphonate, especially disodium pamidronate, has become an important part in the treatment of moderate to severe OI. Its beneficial effect on increasing bone mineral density in the lumbar spine, hip and whole body has been reported in several studies. More and more evidence of beneficial effects on patient growth, as well as their effect on bone pain (3).

Another intravenous bisphosphonate, zoledronic acid, has recently seen its effect on the treatment of adult osteoporosis with little experience of use in pediatric patients. The main advantages of zoledronic acid are its superior potential compared to other bisphosphonates and its long-term benefits in suppressing bone turnover, allowing for less frequent administration. So in this case series the researchers tried to evaluate the administration of bisphosphonate mainly zoledronic acid in pediatric patients suffering from OI

The lack of evaluation of the effect of bisphosphonate on the level of parental satisfaction on the quality of life of pediatric patients, is the main reason the authors conducted quality of life studies in pediatric patients with OI using the SF36 questionnaire which was adapted transcultural to Indonesian people's habits.

CASE(S)

Male, four years Old patients routinely seek bisphosphonate treatment at RSUD Dr. Soetomo, bisphosphonate therapy for 1.5 years. Broken bones 3 times, no surgery has been done. Past Disease History: fractures in the right thigh of February 2017, operated in Dr. Soetomo hospital by dr. TRI (possibly February 6, 2017). Age 10 days history of fractures 4 times in the left thigh, casted hemi spica in Dr. Soetomo General Hospital, Age 1 month right thigh fracture, to alternate, Age 1.5 years right thigh fracture, cast hemisica at Soewandi Hospital Age 2 years right thigh fracture, hemispica cast, Age 2.5 years right thigh fracture, intramedullary nail surgery in Dr.

Soetomo General Hospital . Family Disease History there is no one who had experiences complaints like patients.

From the physical examination, the author found blue color on his sclera, dentinogenesis type I and from the patient's right thigh, the author found deformity, tenderness on the right thigh, and limited ROM due to pain.

Patients have been given zoledronic acid with the protocol 0.05 mg / kgBB diluted with 0.9% NaCl 100 ml zoledronic acid infusion given within 30-45 minutes. The therapy is given every 6 months

Patients were evaluated using the DASH score and SF 36, an increase in SF 36 and a decrease in the incidence of fractures each year.

RESULTS

From DASH score assessment:

- all three patients there were a good development in terms of motor development in upper extremities.
- There were no evaluation in the DASH Work Module section (optional) because the patient is still a child

From the results of SF36:

- Evaluating the quality of life in patients with Osteogenesis imperfecta, it appeared that the development of physical domains and mental domains is better compared to before administration of bisphosphonate.

Table 1. Evaluation of SF 36 before and after bisphosphonate administration

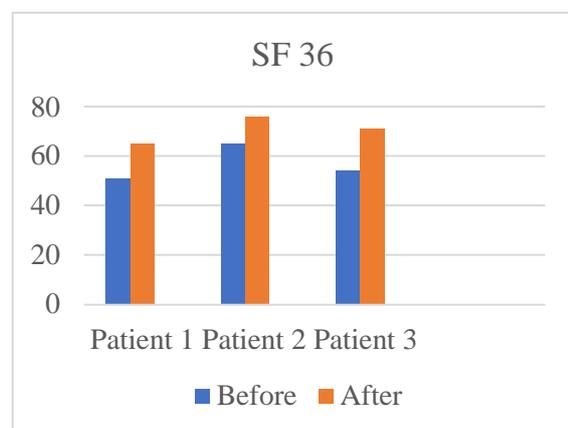


Table 2. Evaluation of DASH score before and after bisphosphonate administration

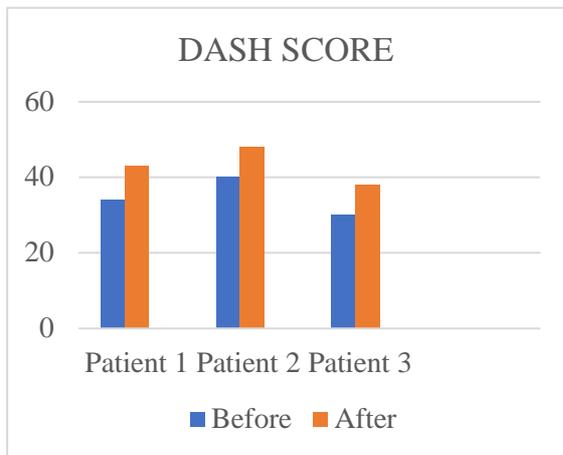


Figure 1: dentinogenesis imperfecta



Figure 2: radiological photo of left femur Osteogenesis imperfecta



Figure 3: Right femur of osteogenesis imperfecta patients

DISCUSSION

Osteogenesis imperfecta (OI) or brittle bone disease is a connective tissue formation disorder that is generally characterized by bone fragility, osteopenia, abnormalities in the skin, blue sclera, dentinogenesis imperfecta (DI), or hearing loss. OI has a varied clinical spectrum, ranging from lethal form at perinatal to mild form. Bone fractures and deformities can occur even with minor trauma. If proven to be OI, bisphosphonate, calcium and vitamin D therapy can be given. Monitoring the side effects of bisphosphonate therapy is important. Nephrotoxic effects will give signs and symptoms of hypertropinemia, namely tachycardia, irritability, tremor, and diarrhea. Complications that can occur are hypocalcemia, a disorder related to osteoporosis, so it is important to ensure adequate calcium and vitamin D intake before and during therapy. In addition, monitoring of medication adherence, drug reactions and possible medication side effects are also monitored. It is also very important to monitor the growth, nutritional status, and development of the patient, hearing function and assessment of quality of life.

Other assessments made in this case are evaluation through DASH score and SF 36 as an evaluation of quality of life in patients that

receiving bisphosphonate. Evaluation was compared between before and after Bisphosphonate administration for 1.5 years.

From the evaluation results using the DASH score, in all three patients there was a good development in terms of motor development in upper extremities. This can be seen from the evaluation of the development of muscle strength and fine motor strength such as writing (drawing), eating his own food without the help of parents and also carrying a heavier burden. It's just that the evaluation of bisphosphonate administration is biased by the motor development of each patient.

In the DASH score assessment, there is no evaluation in the Work Module section (optional), this is due to patients who are still children.

From the results of SF36 evaluation in evaluating the quality of life of OI sufferers in bisphosphonate administration, it appears that the development is better compared to before administration of bisphosphonate. From the point of Public Health, it appears that the patient's development starts from good condition (very good) to very good (very good). Viewed from the point of limited activity, there appears to be a development, which initially the patient is afraid to step, the patient can go further than before bisphosphonate administration.

From the points of Emotional Health and Social Attitude, it can be concluded that patients are bolder to move and move more than before. Before bisphosphonate administration, according to the history of parents the patient was relatively afraid to move; this is due to fear of recurring fractures in the patient. After giving bisphosphonate the patient is more willing to move and play with the surrounding environment.

From the evaluation of Pain points, there was a significant difference between post and before administration of bisphosphonate, this may be due to the reduced frequency of fractures compared to after administration of bisphosphonate.

This is explained because zoledronic acid (bisphosphonate nitrogen) is an inhibitor of bone resorption 100-10,000 times higher than Non-Nitrogen Bisphosphonate (4). The pharmacodynamic effect of Bisphosphonate is to reduce the level of bone resorption and apposition. This situation occurs as long as the patient is treated with Bisphosphonate systemically (5)

The action of Bisphosphonate Nitrogen against osteoclasts is by causing changes in the osteoclast cytoskeleton, such as the loss of the ruffled border and the severing of the actin ring so that the osteoclasts become inactive and undergo apoptosis. This action occurs because Bisphosphonate Nitrogen inhibits Farnesyl Pyrophosphate Synthase (FPPS). FPPS is a Mevalonate enzyme that is responsible for the formation of Guanine Triphosphatase (GTPase). GTPase is important for osteoclast function and survival. So this indirectly suppresses osteoclast activity (6).

Another important modality in handling OI is rehabilitation of physiotherapy. The goal of rehabilitation in OI patients is mainly to improve the area of joint motion and muscle strength, as well as improve ambulation and functional ability. OI's condition is chronic and requires lifelong treatment that can reduce children's quality of life. Therefore, in patients with chronic disease conditions that require long-term therapy even for life, it is very important to provide education about understanding children's diseases, the need for lifetime monitoring and treatment, efforts that need to be made to prevent and minimize complications, the importance of the second role parents in providing appropriate parenting, fostering, and fostering for optimal child growth and quality of life. Psychosocial problems can occur in connection with the level of self-confidence. Psychological counseling and mentoring for both parents can be considered so that parents remain enthusiastic, confident, and not easily discouraged in caring for and caring for their children. Repeated fractures, malnutrition and motor delay are still problems in this patient. Continued monitoring is needed for early detection of OI complications so that it can

suppress disease progression and improve patient quality of life. Subsequent treatment in patients for primary disease is a condition of recurrent fracture that causes stunted development in the patient.

CONCLUSION

1. Significant effects were seen after bisphosphonate administration
2. Need longer observation by involving the total population of patients treated
3. Community observation is very effective in improving compliance of regular administration of bisphosphonate

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