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Table of contents

Ethmoidal osteoid osteoma with orbital extension in a 14 years old boy ........................................ 448
Rupa Maharjan, Prakash Adhikari, Bibhu Pradhan, Narmaya Thapa

Variation of the latissimus dorsi muscle: a case report ............................................................... 451
Shabnam Mohammadi, Sohyela Jafarpour, Ali Akbar Rajah Zadeh, Fatemeh Alipour, Akram Sadeghi

Protein quality evaluation of two rice- and milk-based weaning foods ........................................ 454
Zatolah Asemi, Ashraf Khorrami, Mohsen Taghizade, Zahra Abedini, Zohreh Azarbad, Ali akbar Rashidi

Clinical aspects and laboratory tests of Kawasaki Disease in Iran .............................................. 461
Mohammad Bagher Rahmati, Keramat Allah Jahanshahi, Zahra Jahangiri, Hamidreza Mahboobi, Tahereh Khorgoei

Job Stress and related factors in Nurses in Ilam .............................................................. 465
Mohsen Karchani, Abdullah barkhordari, Abdalhossein pornajaf and colleagues.

Balanitis in Down syndrome-A case from Malaysia ................................................................. 470
Ching Siew Moot, Chia Yook Chin

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Index Copernicus Journals Master List, EBSCO, Directory of Open Access Journals (DOAJ), Genamics JournalSeek, Google Scholar, Open-J Gate, IranMedex Directory of Biomedical Journals, J Gate, IndMedica, Geneva Foundation for Medical Education and Research (GFMER), Utrecht University Library, John Brown University online library, University Library of Regensburg (Electronic Journals Library), Universidad Veracruzana, Library catalog of the University of Groningen, University library of Saskatchewan, and more . . .

http://www.ephysician.ir 447  electronicphysician@gmail.com
Case Report

Ethmoidal osteoid osteoma with orbital extension in a 14 years old boy

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ABSTRACT
Osteoid osteomas are small, benign osteoblastic lesions. Ethmoid bone osteoma has been very rarely reported. We report a rare case of osteoma of ethmoid sinus with orbital extension, in a 14-year-old boy. Excision of the tumor was conducted via external ethmoidectomy approach. Post-operative period was uneventful.

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Keywords: Osteoid osteoma; Ethmoid sinus; External ethmoidectomy
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1. Introduction
Osteoid osteoma is a benign osteoblastic lesion and constitutes 1% of all bone tumors and 11% of benign bone lesions (1). It is usually seen in the second and third decades and a male preponderance has been noted. Osteoid osteomas occur most commonly in the femur, tibia, and spine. As osteomas are usually asymptomatic: they are very often incidental radiographic findings. Most authors agree that small lesions do not need surgery suggesting periodic imaging in order to follow the growth and allow intervention before the development of complications (2).

When osteomas expand into the orbit, this results in displacement of the orbital contents and gives rise to adequate symptoms like diplopia, exophthalmos, and proptosis. Surgery is the treatment of choice for symptomatic ethmoid osteomas. However, the approach depends on the extension and the occurrence of complications (3).

2. Case Presentation
A 14-year-old boy presented in GMS Memorial Academy of ENT and Head and Neck Studies, Kathmandu with the complaint of outward protrusion of the right eye for nine months.

Figure 1. CT-scan of nose and paranasal sinus showing the ethmoidal osteoma with intraorbital extension
The condition was gradually progressive, not associated with pain or any visual symptoms. On clinical examination of nose and paranasal sinuses, there was fullness over the right ethmoidal sinus area, which was a hard, nontender mass just above the right medial canthus measuring 0.5cm x 0.5 cm and fixed to the underlying bone. Examination of the eye revealed the right eye displacing laterally, non-axial proptosis, normal visual acuity without restriction of ocular movement. Exophthalmometry showed 18 millimeters on the right side and 15 millimeters on the left side. Computed tomographic (CT) scan of the nose and paranasal sinuses revealed a homogenous opacity lesion involving the right ethmoid sinus with extension to the right orbital cavity (Fig. 1).

![Figure 2. Pre-operative picture showing ethmoidal osteoid osteoma](image1)

Due to the giant mass, right ethmoidectomy was performed for total removal of the tumor from the ethmoid sinus and the orbital cavity. Pre-operative findings revealed the tumor measuring 4.5 cm × 3 cm × 3 cm in size with erosion of lamina papyacea (Fig. 2, 3). The diagnosis of osteoid osteoma was made after a histopathological report. The postoperative period was uneventful.

![Figure 3. Osteoid osteoma after excision](image2)

3. Discussions

Osteoid osteomas are small, benign osteoblastic lesions. Ethmoid bone osteoma has been very rarely reported. Though it is usually seen in the second and third decades, our patient was a 14- year-old boy. To the best of our knowledge, osteoma of ethmoid sinus with orbital extension in children is the first case reported in the literature. Male preponderance is usually found. The most frequent sites of origin are the frontal sinus in 70% of
The pathogenesis of these tumors still remains to be elucidated, but several theories have been advanced in this respect. These include embryological, genetic, traumatic, infectious, and inflammatory theories (4).

The majority of osteomas is asymptomatic at the early stages and is found incidentally on radiographic examinations for other reasons. Symptoms and signs are related to the tumor size, location, and rate of growth. The most notable of the early symptoms is an intermittent vague pain, gradually increasing in severity, with nocturnal paroxysm. This pain responds characteristically to aspirin treatment (5). When they extend beyond the confines of the sinuses, they may also produce orbital disorders including proptosis, orbital pain, decreased visual acuity, diplopia, epiphoria, or intracranial complications.

Computed tomography is the imaging modality of choice to detect osteoid osteoma, demonstrating a small osteolytic lesion less than 1.5 cm in diameter with a dense sclerotic ring, which has in some cases (20–30%) central calcifications. It should be noted that osteoid osteoma might be even completely calcified (6). Magnetic resonance imaging appearance depends on the amount of calcification within the nidus, the size of the fibrovascular zone, reactive sclerosis, and the amount of edema in the bone, so it may not be diagnostic (6).

Surgery is the treatment of choice for symptomatic ethmoid osteomas. However, the approach is under discussion and depends on the extension and the occurrence of complications (7). In our case, external ethmoidectomy was performed resulting in a complete removal of the tumor from the ethmoid sinus and the orbital cavity. Traditional surgical approaches to the involved sinuses are through external frontoethmoidectomy, lateral rhinotomy or osteoplastic flap technique (8). Technological advantages in endoscopic instrumentation expanded the use of endoscopic surgery for the management of ethmoid osteomas. Recurrence rate after incomplete resection may be up to 10% (1).

4. Conclusion
Osteomas are slow-growing benign lesions. Ethmoidal osteoma as our case with extension into the orbit cavity. Most osteomas are asymptomatic and are incidentally found on radiologic examinations. CT scan is the modality imaging of choice. Surgery is generally accepted for symptomatic osteomas.

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References
Case Report

Variation of the latissimus dorsi muscle: a case report

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ABSTRACT
The latissimus dorsi muscle is used as a muscular flap in head and neck reconstructive surgery. During a routine dissection in our department, we encountered an additional muscular band in the latissimus dorsi on the left side of a male cadaver. This rare muscular variation originated from the latissimus dorsi and inserted into the coracoids process. With regard to important knowledge of such a variation for safe and successful clinical practice, we present a variation of the latissimus dorsi muscle.

Bibliographic Information of this article:

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1. Introduction
The latissimus dorsi muscle is widely used as a muscular flap in reconstructive and plastic surgery, such as cardiomyopathy and mastectomy (1). A variation of the latissimus dorsi muscle is known as Langer's axillary arch, or muscular axillary arch. It is a thin muscular band that extends from the upper edge of the latissimus dorsi to the pectoral muscles, biceps brachi muscle, or coracobrachialis muscle (2, 3). Knowledge of this variation is important for operators and other clinicians performing clinical procedures, especially lymphadenectomy (4).

Embryologic origin of the Langer's axillary arch is not obvious. Apoptosis may be responsible remaining some part of the muscle fibers between the latissimus dorsi muscle and the coracoids process (5, 6). However, the axillary arch was observed in a case with trisomy 13 that suggests a possible genetic cause for this variation (7). In the present study, we have reported this anomalous muscle for surgical considerations.

2. Case Presentation
During axillary dissection on a formol-carbol fixed male cadaver, an unusual muscular variation was found. There was no scar indicative of a previous surgery. This fusiform muscular band was traveled near the subscapular artery and brachial plexus and arose from the upper border of the latissimus dorsi to coracoids process (Figure 1). It had a length of 7 cm and a weight of 0.8 cm. This elevator muscle was innervated through a branch of the thoracodorsal nerve.

3. Discussions
Ramsay named this rare variation Axillary Arch. It is also known as Langer, Langer'ser Achselbogen, and the axillopectoral muscle (2,3). Testut classified these thin muscular bands as complete and incomplete. In complete form, the axillary arch proceeds from the latissimus dorsi to the pectoralis major muscle and in the complete form anomalous band stretched from the latissimus dorsi to biceps brachi muscle, coracoids process or the pectoralis minor muscle (8). The frequency of axillary arch has been reported 7-8 percent. Of course, based on the race, its incidence varies from 1.7 percent in the Turkish population to 43.8 percent in Chinese individuals (9). The location of the axillopectoral muscle has been reported to be either on the left or the right side. In our study, the Axillary arch was situated on the left side (10, 11).
Omar reported the length of axillopectoral 7 cm and its width 2 cm. In a Bulgarian study (2007), the length and the width of axillary arch were 7 cm and 0.6 cm, respectively. Turgut and colleagues measured the muscular slip 9.6 in length and 1.4 in width (6). However, in a study by Merida-velasco the length of the axillary arch was 12 cm and the width was 4 cm (10). In our study, the axillary arch had a length of 7 cm and a width of 0.8 cm, which was consistent with all above reports except the report of Merida-velasco. The shape of the axillary arch has been found as triangle by Del and coworkers (1) while Merida’da-velasco has described it as fusiform (10). In our cadaver, the shape of the muscular band was also found to be fusiform.

Figure 1. Anterior view of the left axillary fossa. ld, latissimus dorsi; pm, pectoralis major; bb, biceps brachi; cb, coracobrachial; aa, axillary artery; s, subscapular artery; tn, thoracodorsal nerve; mn, median nerve; rn, radial nerve; *axillary arch.

Different nerves have been reported for supplying the axillary arch. Some studies have reported cases in which the muscular band was innervated from the lateral pectoral nerve. It has also been shown that branches from pectoralis minor can contribute to the innervation of the axillary arch (6, 10, 11, 13). The axillopectoral is sometimes supplied by the intercostobrachial nerve. Several studies have found that thoracodorsal nerve usually provides innervation of the axillary arch (6, 10, and 14). Similarly, in our study the axillary arch was innervated by the thoracodorsal nerve. In conclusion, information about this variation might be considered by operator at use of the latissimus dorsi muscle in many plastic and reconstructive surgeries.

4. Conclusion
In the present study, we tried to present a muscular variation in the axilla. Information about this variation might be considered by operator at use of the latissimus dorsi muscle in many plastic and reconstructive surgeries.

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References
Original Article

Protein quality evaluation of two rice- and milk-based weaning foods

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ABSTRACT

Background: Protein-energy malnutrition is regarded as a public health problem in developing countries as a result of poor feeding practices due to poverty. This study, therefore, is aimed at protein evaluation of two samples (Cerelac based on rice with milk and Ghoncheh based on rice with milk) of commercial weaning food.

Methods: Biological evaluation of the formulas was conducted in 21-day-old weaning Wistar rats, compared to a control diet of casein. The nutrient quality of the weaning foods was monitored by measuring Protein Efficiency Ratio (PER), Net Protein Ratio (NPR), Relative Net Protein Ratio (RNPR), True Protein Digestibility (TPD), Apparent Digestibility (AD), and Food Efficiency Ratio (FER).

Results: The content of TPD for Casein, Cerelac, and Ghoncheh was 93.77, 93.71, and 78.23, respectively, and the results among groups was significant (P<0.0001). NPR value of Casein, Cerelac, and Ghoncheh was 4.38, 3.45, and 2.93, respectively. Results among the groups were significant (P<0.0001). PER value of Casein, Cerelac, and Ghoncheh was 3.05, 2.22, and 1.4, respectively. Results among the groups was significant (P<0.0001).

Conclusions: Results indicate that TPD, NPR, and PER values of Cerelac were higher than Ghoncheh.

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1. Introduction

Protein-energy malnutrition continues to be a major public health problem among children throughout the developing world (1, 2). Poverty and poor feeding practices have been attributed as major factors responsible for this nutrition problem (1, 3, and 4). Recent reports from the World Health Organization show that about 60 percent of all deaths occurring among children under 5 years of age in developing countries can be attributed to malnutrition (5). It is also estimated that about 50.6 million children under the age of 5 are malnourished, 90 percent of whom are from developing countries (6, 7). On the other hand, optimum use of protein required for the body depends on digestibility and pattern of essential amino acids (8). Therefore, determining and assessing the protein quality of food consumed is biologically necessary in terms of nutritional planning (8, 9). Food processing affects the pattern and bioavailability of essential amino acids and ultimately the protein quality of the end product (10-12). Thus, the necessity of using accurate, sensitive, rapid, and applicable methods to determine the quality of protein is felt. These methods should be able to measure the true protein digestibility and the efficiency of protein being used (13-16).

In general, protein quality assessment methods include biological, microbiological, chemical, and integrated approaches. Among the available methods, True Protein Digestibility (TPD), Apparent Digestibility (AD), Net Protein Ratio (NPR), Protein Efficiency Ratio (PER), Food Efficiency Ratio (FER), Net Protein Utilization (NPU), Biological Value (BV), and Protein Digestibility-Corrected Amino Acid Score (PDCAAS) are suggested as suitable methods for determining protein quality (17-19). The content of Cerelac TPD and wheat flour + soybean mixture, 50:50 ratio, was reported as 90.8 (18) and 92 (8) by other researchers. The content of homemade food NPR (based on the appropriate cereal/legume mixture) was reported as 2.25 (14) by other researchers. Content of Cerelac and homemade food PER (based on the appropriate cereal/legume mixture) was reported as 2.1 (18) and 2.52 (14). Therefore, considering the importance of protein qualitative value of foods, especially in low-income families,
the study and evaluation of the proposed methods regarding the accuracy and applicability in that country seem to be necessary and can be used as a measurement to control the quality of products in future cases. Thus, this study was designed to compare the protein value of two commercial baby foods (Cerelac based on rice with milk and Ghoncheh based on rice with milk) on rats in Qom and Kashan University of Medical Sciences in 2010.

2. Material and Methods

This experimental study was performed on 64 male wistar rats, at weaning age (21 days). The animals were purchased from the Pasteur Institute (Karaj Branch). At first, samples of Cerelac and Ghoncheh were analyzed in terms of moisture, fat, fiber, ash, and protein by laboratory methods (20) to be used in the experimental diets. In the study, TPD and AD were used in two test diets (Cerelac based on rice with milk from Nestle-Iran.com and Ghoncheh based on rice with milk from Ghoncheh Parvar food products.com), a standard diet (Casein + Methionine), and a basal diet (free-protein) and for the study NPR, PER, and FER tests (study conditions in PER and FER were similar to NPR, except for PER study period, which was 28 days and it was a protein-free diet) two experimental test diets, a standard and a basal diet, were used. Regarding the compounds of homemade foods, the amounts of food and main nutrients were adjusted for the experimental diet (Table 1).

After being transferred to the laboratory, the rats were freely fed commercial baby food for five days (acclimation period). Then the animals were divided randomly into eight experimental groups of eight rats in each group: each group including two blocks and each block including four rats (a total of 64 primary rats). For evaluation of TPD and AD, four groups: Casein + Methionine, free-protein, Cerelac, and Ghoncheh, and for NPR, PER and FER evaluation, four groups: Casein + Methionine, free protein, Cerelac, and Ghoncheh. According to results of similar studies, division of rats into blocks was by difference between blocks in term weight in the range of 0.5 g (18, 19, and 21). The rats were individually housed in polypropylene cages with suspended-wire bottoms in an animal care room maintained at 22±2˚C and 50-70 percent relative humidity with alternating 12-hour periods of light and darkness throughout the study.

The test lasted for nine days including four first days of the preliminary period and five final days of balance period. During the test period, the animals, food was limited to 15 grams per day (based on dry matter), but the rats had free access to water. At the end of the balance period, food was in the air for three days. Then the amount of nitrogen intake by each rat was calculated. Fecal samples were placed in glass containers for three days at 50 ºC and the level of nitrogen were determined (8, 18, 19, 22-29). TPD calculation is performed through the following relationship:

\[ TPD = \frac{Ni - NF1 - NF2}{Ni} \times 100 \]

NF1: Nitrogen excreted in stools of test group
NF2: Nitrogen excreted in stools of without protein group

AD calculation is performed through the following relationship:

\[ AD = \frac{Ni - NF1}{Ni} \times 100 \]

For the NPR determination, the animals were freely given food and water for 14 days. Food poured in each cage was collected separately and kept in plastic containers then kept at room temperature. Finally, protein intake by each rat was calculated and the NPR of each test and standard protein sources was reported for each rat (15, 18, 19, 21, and 27).

\[ NPR = \frac{Weight gain of test group + weight loss of free-protein group}{Weight of test protein consumed - protein intake of free-protein group} \]

Relative NPR = (mean NPR of test protein) × 100/ mean NPR of reference protein

To determine the PER and FER, food and water were provided with no limitations for rats. Rats were fed under three diets (Casein, Cerelac and Ghoncheh) and finally were weighed after four weeks. Weight gain was recorded during this period then PER was calculated through the following relationship (15, 17-19, 21, 22, 30, and 31):

\[ PER = \frac{Gain in body weight (g)}{Protein consumed (g)} \]

Also PER was calculated through the following relationship:

\[ FER = \frac{Gain in body weight (g)}{Food consumed (g)} \]

The content of NPR, TPD, AD, PER, and FER were determined in Casein + Methionine and commercial baby foods groups and was analyzed by ANOVA test together with Scheffe, Dunett’s T3 tests to compare between the groups. In all tests, the content of P<0.05 was considered significant.
3. Results

This study was done on 64 rats, divided in eight groups of eight rats. Protein intake on the Ghoncheh diet for studying TPD was the highest (4.92 g per rat). Protein excretion on the Ghoncheh diet was the highest (1.15 g per rat) and it differed significantly ($p<0.0001$) from that of other diets, in which protein excretion ranged from 0.42 to 0.46 g per rat (Table 2). The content of TPD on the Casein diet was the highest (93.77 %) and it differed significantly ($p<0.0001$) from that of another diet Ghoncheh. Also the content of TPD of the Cerelac group was significantly higher than Ghoncheh group (Table 2).

Weight gain on the Casein diet for the study NPR was the highest (35.56 g per rat) and it differed significantly ($p<0.0001$) from that of other diets, in which weight gain ranged from 15.76 to 21.98 g per rat. Food intake on the Casein diet was the highest (137.01 g per rat). Protein intake on the Casein diet was the highest (13.51 g per rat). The content of NPR on the Casein diet was the highest (4.38 per rat) and it differed significantly ($p<0.0001$) from that of other diets, in which NPR ranged from 2.93 to 3.45 per rat. Also the content of NPR on the Cerelac diet was significantly higher than Ghoncheh diet (Table 3).

| Table 1. Raw materials for preparing the experimental diets (g per 100 g) |
|--------------------------|----------------|----------------|-----------------|-----------------|
| Diet ingredients        | Cerelac        | Ghoncheh       | Caseine+Methionine | Free-Protein   |
| Casein                  | 0              | 0              | 10               | 0.2             |
| Cerelac                 | 66.7           | 0              | 0                | 0               |
| Ghoncheh                | 0              | 66.7           | 0                | 0               |
| Sugar                   | 5              | 5              | 5                | 5               |
| Corn oil†               | 3.3            | 3.3            | 10               | 10              |
| Vitamins                | 1              | 1              | 1                | 1               |
| Minerals                | 4              | 4              | 4                | 4               |
| Fiber (cellulose)††     | 4.1            | 4.7            | 5                | 5               |
| L-Methionine            | 0              | 0              | 0.3              | 0               |
| Choline chloride        | 0.2            | 0.2            | 0.2              | 0.2             |
| Corn starch             | 15.7           | 15.1           | 64.5             | 74.6            |

†Set based on existing fat, protein, and starch sources, to reach 10 percent fat level in final diet
††Set based on existing non-soluble fiber, protein, and starch sources, to reach 5 percent fiber level in final diet

| Table 2. Protein intake, protein excretion, TPD and AD commercial baby foods in rats for five days |
|-----------------------------------------------|----------------|----------------|
| Diets                                | Protein intake | Protein excretion |
| Casein                               | 4.55±0.92      | 0.42±0.1        |
| Cerelac                              | 4.72±0.89      | 0.46±0.13       |
| Ghoncheh                             | 4.92±1.32      | 1.15±0.56       |
| P-value                              | P=0.78         | P<0.0001†       |
| TPD in vivo                          | 93.77±3.04     | 90.12±3.62      |
| AD in vitro                          | 74.76±13.12    | 74.76±13.12     |

† significant different Casein group with Ghoncheh and Cerelac group with Ghoncheh used to ANOVA test together with Dennett’s T3

| Table 3. Weight gain, food intake, protein intake, NPR, and RNPR commercial baby foods in rats for 14 days |
|-----------------------------------------------|----------------|----------------|----------------|----------------|
| Diets                                | Weight gain | Food intake | Protein intake | NPR | RNPR |
| Casein                               | 35.56±10.64 | 137.01±1.02 | 13.51±1.4      | 4.38±0.47 | 100   |
| Cerelac                              | 21.98±9.43  | 132.76±27.35| 13.27±2.73     | 3.45±0.32 | 78.76 |
| Ghoncheh                             | 15.76±7.37  | 134.71±15.99| 13.47±1.59     | 2.93±0.35 | 66.89 |
| P-value                              | P=0.001†    | P=0.91      | P=0.96         | P<0.0001††  | -     |

† significant different Casein group with Ghoncheh and Cerelac groups used to ANOVA test together with Scheffe
†† significant different Casein group with Ghoncheh and Cerelac groups; Cerelac group with Ghoncheh group used to ANOVA test together with Scheffe

Weight gain on the Casein diet for studying PER and FER was the highest (90.06 g per rat) and it differed significantly ($p<0.0001$) from that of other diets where weight gain ranged from 39.61 to 71.42 g per rat. Food intake on the Cerelac diet was the highest (331.01 g per rat) and it differed significantly ($p=0.008$) from that of other
After six months of life, infants need to take adequate energy and nutritious weaning foods to supplement breast milk (32). However, as scientific studies have revealed, in many parts of developing countries, most of the traditional weaning foods were made up of cereals and tubers that are low in protein and other essential micronutrients, which are vital for the normal physical growth and cognitive development of a child (1, 32).

Results of this study showed that Cerelac commercial weaning food based on rice with milk has higher protein value than Ghoncheh based on rice with milk and is almost equal to Casein standard. The content of TPD for the protein of Cerelac and Ghoncheh in this study was obtained 93.71 and 78.23. While Essien, et al., reported 73.5 for Nutrend commercial weaning food (33), Al-othman, et al., 93-95 for Cerelac based on milk (21), Al-othman, et al., 94-95 for Cerelac based on milk with wheat (21) and Essien, et al., 87 for Cerelac based on milk with wheat (34) which was almost similar to Cerelac in our study. The content of TPD for the protein of Casein in our study was 93.77 whereas Al-othman, et al., reported it to be 96 (21); Koo, et al., 99 (35), and Gahlawat, et al., 92 (18), similar to this study. On the other hand, the main factors that caused the difference in the TPD content of casein and commercial weaning food is protein intake and excretion in experimental groups.

The content of NPR for the protein of Cerelac and Ghoncheh in this study was obtained 3.45 and 2.93, while Essien, et al., reported it to be 2.23 for Nutrend commercial weaning food (33), Asemi, et al., 4.3 for Cerelac based on milk (34), and Ijarotimi, et al., 1.29 for Nutrend commercial weaning food (1). The content of NPR for the protein of Casein in this study was 4.38 whereas Mensa-Wilmot, et al., reported it to be 3.5 (22), Kalra, et al., 3.65 (19) and Asemi, et al., 4.3 (34). In other words, the differences between Casein and NPR is related to the amount of food, protein intake, the quality of protein consumed (the main factors in calculating NPR includes test group weight gain, non-protein group weight loss, test group protein intake). The content of PER for the protein of Cerelac and Ghoncheh in this study was obtained 2.22 and 1.4 while Gahlawat, et al., reported 2.31 for Cerelac (18), Ijarotimi, et al., 2.09 for Nutrend commercial weaning food (1), and Essien, et al., 2.06 for Nutrend commercial weaning food (33). The content of PER for the protein of Casein in this study was 3.05 whereas Asemi, et al., reported it to be 3 (34), Mensa-Wilmot, et al., 3.5 (22), and Kalra, et al., 2.87 (19).

Overall, protein quality is affected by several factors, the most important of them include: 1: Type of protein: the digestion and absorption of plant proteins is less than animal proteins as they get trapped in the carbohydrate cell wall and are less accessible (8). 2: Food processing: Food processing may cause more destruction of amino acids and reduce their bioavailability. For example, in milk processing, the average temperature in the presence of reductive sugars (glucose and galactose), causes loss of availability of amino acid lysine, which it so-called brown or Millard reaction, and wastes lots of lysine in high temperatures (36, 37). 3: Low protein digestibility of the diet in developing countries can be because of less refined cereal/legume being used and this is true particularly for wheat (8).4: The rating of commercial formula (Cerelac) compared to Ghoncheh in term of color, aroma, taste, mouth feel, and overall acceptability could be attributed to the incorporation of coloring, sweetening, and other sensory enhancing agents to the formula during its formulation, therefore it causes higher food intake. 5: Several findings have revealed that infant foods made of cereals or tubers were low in several nutrients including protein, vitamin A, zinc, and iron. These nutrients are of special importance due to their impact on physical and cognitive development (38, 39). Ghoncheh weaning food introduced in this study has lower content iron element

Table 4. Weight gain, food intake, protein intake, PER, and FER commercial baby foods in rats for 28 days

<table>
<thead>
<tr>
<th>Diets</th>
<th>Weight gain</th>
<th>Food intake</th>
<th>Protein intake</th>
<th>PER</th>
<th>FER</th>
</tr>
</thead>
<tbody>
<tr>
<td>Casein</td>
<td>90.06±14.34</td>
<td>297.13±27.23</td>
<td>29.36±2.71</td>
<td>3.05±0.24</td>
<td>0.3±0.02</td>
</tr>
<tr>
<td>Cerelac</td>
<td>71.42±15.12</td>
<td>331.01±33.91</td>
<td>31.85±4.38</td>
<td>2.22±0.2</td>
<td>0.21±0.03</td>
</tr>
<tr>
<td>Ghoncheh</td>
<td>39.61±8.36</td>
<td>279.83±28.26</td>
<td>27.98±2.82</td>
<td>1.4±0.21</td>
<td>0.14±0.02</td>
</tr>
<tr>
<td>P-value</td>
<td>P&lt;0.0001†</td>
<td>P=0.008§†</td>
<td>P=0.09</td>
<td>P&lt;0.0001†</td>
<td>P&lt;0.0001†</td>
</tr>
</tbody>
</table>

† Significant different Casein group with Cerelac and Ghoncheh groups; Cerelac group with Ghoncheh group used to ANOVA test together with Scheffe
§ Significant different Cerelac group with Ghoncheh group used to ANOVA test together with Scheffe
than Cerelac and lacks a Mg element. Mg element is involved in glycolic and citric acid cycle (energy metabolism).

6: Several findings showed that Probiotics are involved in improving lactose tolerance (40-43). Existence of bифidobacterium лactis in Cerelac weaning food has led to a higher protein quality than Ghoncheh.

The results obtained by qualitative biological evaluation through TPD, NPR, and PER methods on Casein protein sources, Cerelac, and Ghoncheh were satisfactory and indicate the right formulation of diet and suitability of Wistar race for the study. Generally nutritional quality of protein is affected by three factors: 1: combination of amino acids 2: protein digestion 3: consumers’ need for amino acids. Therefore, high-quality protein combined with amino acids is completely digested when the pattern of amino acids corresponds to the human and animal’s needs (44).

5. Conclusion

The study suggested that the protein quality of Cerelac was higher than Ghoncheh weaning food. Therefore it is suggested:
1: Researchers conduct projects on the other supplements of cereal/legume to obtain the useful results.
2: It's recommended that standard rules apply for homemade food protein based on cereal/legume.
3: Considering almost lower actual protein digestibility of Ghoncheh in this study compared with similar foreign ones, it is necessary to take basic policies to increase the quality of proteins, including temperature control at the time of production.

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Original Article

Clinical aspects and laboratory tests of Kawasaki Disease in Iran

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ABSTRACT

Background: Kawasaki Disease (KD) is a self-limiting vasculitis and is the main cause of acquired cardiac disease in childhood in developed countries. Early diagnosis and treatment of KD is necessary for prevention of cardiac complications in adolescence. The aim of the present study is to assess clinical aspects and laboratory tests in KD in Iran.

Methods: The study, undertaken in 2009, included all patients admitted to Kudakan hospital in Bandarabbas with a diagnosis of KD during 1997 to 2008. Forty-two children were included in this study. Seven patients were excluded because of incomplete records. All eligible patients’ records were reviewed and data including age, sex, clinical findings, and laboratory test results were summarized in a structured checklist. Data were analyzed using SPSS 13.0 for Windows (SPSS Inc., Chicago, Illinois, USA) software.

Results: Among the 35 patients studied, seven (20%) were female, and 28 (80%) were male. Mean age of the patients was 3.35±2.4. Fever was seen in 35(100%) patients, noninfectious bilateral conjunctivitis in 16(45.71%), noninfectious unilateral conjunctivitis in two (5.7%), lip color change in 18(51.4%) involvement of oropharynx in 19(54.3%), strawberry tongue in 11(31.4%), maculopapular rash in 18(51.4%), and erythematous skin in six (17.1%). Ten patients had an erythrocyte sediment rate (ESR) less than 30.

Conclusion: Prevalence of clinical findings in Iran is variable among different areas. Thus KD should be considered in all children with fever lasting five days or longer to prevent cardiac complications in future.

Bibliographic Information of this article:


Keywords: Kawasaki Disease; Clinical Aspects; Laboratory Tests

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1. Introduction

Kawasaki Disease (KD) was described by Tomisaka Kawasaki in 1960 and may occur in any child regardless of race and ethnicity (1). Reports of the condition among adult patients are rare (2). KD is a self-limiting vasculitis but is considered significant because of its risk of secondary cardiac problems such as coronary artery aneurysm and myocarditis (1). KD is the main cause of acquired cardiac disease in childhood in developed countries. It is most prevalent in Japan, Korea, and Taiwan (3). In some countries, its prevalence appears to be increasing. However, this may be an artifact introduced by improved diagnosis (4). In some cases, the diagnosis is very difficult and knowledge of the classic characteristics of the disease may be inadequate for diagnosis (5).

Clinical presentation of KD is different among various age groups. Non-characteristic presentation in patients under 1 year old, and failure to respond to intravenous immunoglobulin (IVIG) in patients over 5 years old, increases the prevalence of cardiovascular complications among these groups of patients (6). Pyuria is seen more commonly in KD when compared to other febrile disease, but this marker is neither specific nor sensitive for this disease (7). Biological markers effective in KD and its mechanisms aren’t completely understood yet (8).
Early diagnosis and treatment of KD is necessary for prevention of cardiac complications in adolescence. The aim of the present study is to assess clinical aspects and laboratory tests in KD in Iran.

2. Material and Methods
This study was undertaken for a medical student thesis and as such was approved by the research committee of Shariati medical school in Hormozgan University of Medical Sciences (HUMS). The study, undertaken in 2009, included all patients admitted to Kudakan hospital in Bandarabbas with a diagnosis of KD during 1997 to 2008. Kudakan hospital is the only educational pediatric hospital in Bandarabbas serving Hormozgan University of Medical Science (HUMS). Bandarabbas is the largest and most populated city in the Hormozgan province, located in southern part of Iran. The climate is hot and humid.

Forty-two children were included in this study. Seven patients were excluded because of incomplete records. Thus, 35 records were assessed.

The criteria for diagnosis of KD in these patients were:
1- Fever lasting five days or longer
2- Four of these five clinical finding:
   - Polymorphous rash
   - Bilateral conjunctival injection
   - Cervical lymphadenopathy (at least one lymph node >1.5 cm in diameter)
   - Injected or fissured lips, strawberry tongue, injected pharynx
   - Erythma and edema in palms and soles and delayed desquamation
3- Negative blood and urine culture and clinical examination for infective causes and other disease.

Patients with “incomplete KD” were also included in this study. Such patients had fever lasting five days or longer but had less than four of the relevant clinical findings. All eligible patients’ records were reviewed and data including age, sex, clinical findings, laboratory test results and also their echocardiography results and treatments were summarized in a structured checklist. Patients’ names were not recorded; instead a code was used for each patient to protect anonymity.

Data were analyzed using SPSS 13.0 for Windows (SPSS Inc., Chicago, Illinois, USA) software. Descriptive statistics (Mean, Standard Deviation, Frequencies) were used for analysis.

3. Results
Among the 35 patients studied, seven (20%) were female and 28 (80%) were male. Mean age of the patients was 3.35±2.4. Ages ranged from 6 months to 9 years. Six patients (17.14%) were less than 1 year old and seven (20%) were more than 6 years old. Twelve (34.27%) patients were admitted in winter, 11(31.42%) in spring, seven (20%) in summer and five (14.28%) in autumn.

Fever was seen in 35(100%) patients, noninfectious bilateral conjunctivitis in 16(45.71%), noninfectious unilateral conjunctivitis in two (5.7%), lip color change in 18(51.4%), involvement of oropharynx in 19(54.3%), strawberry tongue in 11(31.4%), maculopapular rash in 18(51.4%), and erythematous skin in six (17.1%). Also six (17.1%) patients had maculopapular rash with erythematous skin.

Unilateral lymphadenopathy (More than 1.5 cm in diameter) was seen in six (17.1%) patients and bilateral lymphadenopathy in nine (25.7%). Involvement of extremities was seen in eight (22.9%) with erythma, in four (11.4%) with edema, in seven (20%) with skin desquamation. One patient had platelet count less than 100,000, and two patients had platelet counts of more than 600,000. (See Chart 1) Ten patients had an erythrocyte sediment rate (ESR) less than 30. White Blood Cell (WBC) counts were less than 100,000 in 17 (48%) of patients, between 10,000 to 15,000 in 12 (34%), and more than 15,000 in six (28%) patients. CRP was not raised in 12(34%) patients. Twelve (34%) patients had hemoglobin level less than 10mg/dl, 10(28%) had hematocrit less than 30%, 17(48%) between 30-35, and eight (22.8%) more than 35%.

4. Discussions
Patients’ ages in our study were similar to previous studies in Iran. All of these studies reported some cases less than 1 year old. In Esfahan, the authors reported some cases up to 13 years old (9)but all cases in our study were less than 10 years old. Male to female ratio was 4:1 in our study, which is similar to studies done in Kermanshah (10). Also in Esfahan, Kashan (11), Tehran (12), and Mazandaran (13) KD was more prevalent among males than females. One study from Qazvin showed KD to be more prevalent among males (M/F=0.45).

About 65% of cases were admitted in spring and winter in our study. Similar results were reported from Kermanshah, Qazvin (14), Kashan and Tehran. But in Mazandaran (13) KD was more prevalent in autumn. Fever was seen in 100% of patients and this finding was compatible with other report in Kermanshah, Qazvin, Esfahan, and
and Kashan. This is unsurprising as this is a major diagnostic criteria for KD, and thus an inclusion criteria, for the study.

In our study, changes in oral mucosa and lip were the most prevalent clinical findings after fever. This was compatible with studies in Qazvin and Kashan. In Kermanshah and Esfahan, the most prevalent clinical finding after fever was noninfectious conjunctivitis. Noninfectious conjunctivitis was more prevalent among KD patients in Kermanshah, Qazvin, Esfahan, and Kashan than in this study. Cervical lymphadenopathy was seen in 42.8% of KD patients in our study but this was seen in 65.2% of patients in Kermanshah, in 58.6% in Qazvin, in 62.2% in Esfahan, in 67% in Kashan, and in 70% of patients in Tehran.

Skin rash was seen in 51.4% of patients in our study and was compatible with similar study in Qazvin. In studies in Kermanshah, Esfahan and Kashan this finding was more prevalent. The prevalence of changes in extremities in our study was similar to studies in Kermanshah, Qazvin, Esfahan, and Tehran. Platelets count was less than 400,000 in 37% of patients in our study. This rate was lower than other studies in Iran. Also thrombocytosis was seen in 8.4% of patients in Qazvin and was lower than our study. Studies in Esfahan and Kashan reported thrombocytosis in 74.3% and 71% of patients respectively. An ESR level of more than 30 was seen in 48.5% of our patients, but this rate was 75.9% in Qazvin, 93.3% in Esfahan, 91% in Kashan, and 80% in Tehran. Raised CRP was reported in 23 (65.7%) of our patients and was almost compatible with studies in Qazvin and Esfahan.

5. Conclusion
KD is seen in children less than 1 year old to about 13 years in studies in Iran. It appears to be more prevalent in males and occurs most frequently in spring and winter. Prolonged fever is the most common clinical finding followed by noninfectious conjunctivitis and changes in oral mucosa and lips. But the prevalence of these latter presentations is variable among different studies undertaken in Iran. Prevalence of clinical findings in Iran is variable among different areas. Thus KD should be considered in all children with fever lasting five days or longer to prevent cardiac complications in future.

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Original Article

Job Stress and related factors in Nurses in Ilam

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ABSTRACT

Background: Nowadays, in most countries of the world, especially in industrial societies and the societies in which the social and economical chaos have disrupted the normal life, social sources of stress have got common more than ever, in a way that stress is considered as the black plague in the current era. The aim of this study is to assess Job stress and related factors in nurses in Ilam.

Methods: This study is of the descriptive-analytical kind, which was performed in a temporary way. The sample was consisted of all nurses working in governmental hospitals of Ilam city. Sampling was performed through consensus, and the Cooper’s job stress questionnaire was used for collecting data. SPSS software and one-way Analysis Of Variance (ANOVA) test were used to analyze the data.

Results: 56 percents of research units have experienced severe stress. Using the ANOVA test, a significant relationship was observed between the average years of employment and the kind of the hospital and the average level of stress (p<0.05).

Conclusion: Our results show that in the begging years of employment and in nurses with low record of employment stress is severe, and after ten years of employment stress level declines. Conflict with other nurses and physicians, and also lacking enough skill for performing nursing services, are the main causes of prevalence of stress among nurses in governmental hospitals in Ilam.

Bibliographic Information of this article:

Keywords: Job stress; Nurse; Governmental hospitals; Ilam

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1. Introduction

In most of the present societies, human life, in terms of the life environment and lifestyle, has drastically changed in comparison with the past years. Nowadays, in most countries of the world, especially in industrial societies and the societies in which the social and economical chaos have disrupted the normal life, social sources of stress have got common more than ever (1). Till the beginnings of the 1908s, there was an increasing growth in noticing the stress-promoting factors and the causes of stress in work and life in the west. These changes were more intensified till 1990. Science and technology had a significant impact on the degree of these changes. For instance, after the advent of airplane and the discovery of electricity in 1900, radar and television in the 1930s, nuclear energy in the 1950s, space explorations in the 1960s and 1970s, and the information technology and the internet in the 1980s and 2000s, the degree of job stress and also the lifestyle were changed (2). The people living in the 20th century are witnessing more extensive changes in their daily life and environment compared to the past. The rate of these changes accelerates and also gets more complicated as the time goes on. Therefore, increasing number of researches started to work on the field of stress, and some new scientific fields such as industrial psychiatry and working medicine were established (3).
In a study, Jones and Bright (2001) state that in spite of the presence of relatively suitable levels of welfare and health in the west, stress has increased during this decade and is still on increase (4). In order to be effective in eliminating the causes of job stress, it seems essential to be able to identify them. This would be of higher importance when we note the fact that different causes of stress make different effects, and consequently, need different methods and specific mechanisms to encounter (5).

Nursing is one of the jobs which impose the employee to stress (6). Among major sources of stress for nurses we can name factors such as: facing with mortality, conflict with colleagues, inadequate readiness for facing with the sick and their families, lack of enough support, high load of work, variability of treatment programs, facing with sufferings of the sick, taking care of the sick afflicted with infectious diseases (having contact with blood and infected excretions,...), lack of job guarantee, dissatisfaction with the managers’ evaluations, lack of enough knowledge and skill for the job, and anxiety about making mistakes and its consequences. Other factors which have become stress-causing in the nursing occupation are: emergence of new roles for nurses, new principles of management, new rules and instructions in providing nursing services, and revolution in methods of education and training the nurses, which compels them to accept more responsibilities and improve their knowledge and skills to stay employed in their job (6, 7).

In addition, patients have their own special emotional needs, which in case of provision; will increase their chance of recovery. Nurses, in the same way, have specific emotional needs, the provision of which will help them work better. Therefore, the stress arisen from occupational and environmental stress-causing factors can have negative effects on nurses, and consequently, affect the cure and healing of the patients (8, 9). In addition, half of the nurses’ awaking times are spent in hospitals and close to patients, so maybe half of the stresses of their lives originate from there. The stress-causing conditions of the nursing job, accompanied by the daily stress-causing factors, results in further ennuin of nurses, which will consequently affect the caring of patients. After some researches, Results of several researches show that when the work is more quick and performed faster, the resulting stress and involvement will be higher (9, 10), and when more time is allotted to the work, the conflict and inconsistency between familial life and work will become more severe. These findings reveal the fact that much physical activity during work will make the person too tired after work, and consequently, negatively affect his/her behavior with others (colleagues and family members)(8, 11).

According to the mentioned issues, it seems that nurses go on their jobs under considerable challenges and stresses, and there is no doubt that these factors can have negative effects on their work. Since nursing is one of the most stress-causing jobs, identification of stress-causing factors will be an effective step towards prevention, cure, and decrease of stress. This is the aim for which the present work was designed and accomplished.

2. Material and Methods

This study is of the descriptive-analytical kind, which was performed in a temporary way. In this project, consensus was used for data collection, in a way that thorough going to different sections of the hospitals in different work shifts, questionnaires was provided to and filled out by the participants. In order to investigate the relationship between stress and the demographic characteristics of the nurses, a form was prepared to record general characteristics of the nurses such as age, gender, level of education, marital status, previous record of employment, the amount of salary and extra pays, job position, name of the section and the hospital, and the work shift. In the next stage, the Cooper’s questionnaire of stress in job environment and intense work conditions was prepared. This questionnaire, as a screening tool, is one of the most commonly used means for measuring the degree of stress in job environment. It is used extensively as a measure for job stress in most countries, and consists of 32 questions which examine the presence of signs of job stress. Four degrees are considered for each group.

The examinee chooses a choice which is closest to experience of him/her during the last month among the four choices. Each question has four possible answers: never, sometimes, often, and always. For each choice the lowest score is 0 and the highest score is 3. Total scores lower or equal to 39 is assigned with low stress, scores ranging from 40 to 62 show medium level of stress, and scores equal or higher than 63 represent high level of stress. Finally, the collected data were analyzed using SPSS software.

3. Results

The whole population studied by this project was consisted of 100 nurses selected and studied from two hospitals of Imam Khomeini and Mustafa Khomeini and Alleghany. According to the data presented in Table 1, %56 of the studied persons was female and %44 of them was male. As observed in the table, the male gender has the lowest percentage of low-stress persons and the female gender has the highest percentage of low-stress persons. According to the above table, there is no significant difference between the stress levels of the two genders (P=0.479 and T=0.7).
According to Table 2, %36 of the studies persons are single %64 of them are married. As observed in the above table, no significant difference exists between the stress levels by marital status (P=0.565 and T=0.57).

Another parameter which was investigated in this study was the level of education among the studied sample of nurses. According to Table 3, %89 of nurses hold the Bachelor’s degree and %11 of them have Master degree. As observed in the above table, no significant difference exists between the stress levels by level of education (P=0.857 and T=0.18). According to Table 4, %37 of the studied persons have less than 5 years of employment record, %13 of them have 5-10 years, %36 of them have 10-20 years, and %14 of them have more than 20 years of employment record. As observed in the above table, there is a significant difference between the stress levels by previous record of employment (P=0.026). According to Table 5, %80 of the studied persons is working as nurse, 13 of them are working as head nurse, and %7 of them are working as supervisor. As observed in the above table, no significant difference exists between the stress levels by current job position (P=0.0447 and F=0.812).

**Table 1.** The average level of stress by age in the studied group.

<table>
<thead>
<tr>
<th>Level of stress</th>
<th>Frequency</th>
<th>Average</th>
<th>Standard deviation</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age group</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>56</td>
<td>64.55</td>
<td>11.74</td>
<td>0.479</td>
</tr>
<tr>
<td>Male</td>
<td>44</td>
<td>62.84</td>
<td>12.24</td>
<td></td>
</tr>
</tbody>
</table>

**Table 2.** The average level of stress by marital status in the studied group

<table>
<thead>
<tr>
<th>Level of stress</th>
<th>Frequency</th>
<th>Average</th>
<th>Standard deviation</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marital status</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single</td>
<td>36</td>
<td>64.72</td>
<td>9.67</td>
<td>0.565</td>
</tr>
<tr>
<td>Married</td>
<td>64</td>
<td>63.28</td>
<td>13.08</td>
<td></td>
</tr>
</tbody>
</table>

**Table 3.** The average level of stress by level of education in the studied group

<table>
<thead>
<tr>
<th>Level of stress</th>
<th>Frequency</th>
<th>Average</th>
<th>Standard deviation</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level of education</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Bachelor</td>
<td>89</td>
<td>63.87</td>
<td>12.24</td>
<td>0.857</td>
</tr>
<tr>
<td>Master</td>
<td>11</td>
<td>63.18</td>
<td>9.45</td>
<td></td>
</tr>
</tbody>
</table>

**Table 4.** The average level of stress by previous record of employment in the studied group

<table>
<thead>
<tr>
<th>Level of stress</th>
<th>Frequency</th>
<th>Average</th>
<th>Standard deviation</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Record of employment</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than 5 years</td>
<td>37</td>
<td>65.64</td>
<td>9.31</td>
<td>0.026</td>
</tr>
<tr>
<td>5-10 years</td>
<td>43</td>
<td>70.69</td>
<td>14.99</td>
<td></td>
</tr>
<tr>
<td>10-20 years</td>
<td>36</td>
<td>61.22</td>
<td>11.84</td>
<td></td>
</tr>
<tr>
<td>More than 20 years</td>
<td>14</td>
<td>59.14</td>
<td>3.84</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>63.80</td>
<td>11.93</td>
<td></td>
</tr>
</tbody>
</table>

**Table 5.** The average level of stress by current job position in the studied group

<table>
<thead>
<tr>
<th>Level of stress</th>
<th>Frequency</th>
<th>Average</th>
<th>Standard deviation</th>
<th>F</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Position</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nurse</td>
<td>80</td>
<td>64.46</td>
<td>11.09</td>
<td>0.812</td>
<td>0.447</td>
</tr>
<tr>
<td>Head nurse</td>
<td>13</td>
<td>62.38</td>
<td>12.70</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supervisor</td>
<td>7</td>
<td>58.85</td>
<td>17.74</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>63.80</td>
<td>11.93</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Table 6.** Determination of relationship between partial stress scores with the total score

<table>
<thead>
<tr>
<th>Stress-causing factor</th>
<th>Average</th>
<th>Standard deviation</th>
<th>Results of the statistical test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conflict with physician</td>
<td>5.88</td>
<td>2.92</td>
<td>P value= 0.004</td>
</tr>
<tr>
<td>Conflict with other nurses</td>
<td>5.37</td>
<td>2.76</td>
<td>P value= 0.026</td>
</tr>
<tr>
<td>Lack of enough skill for performing nursing services</td>
<td>3.06</td>
<td>1.53</td>
<td>P value= 0.022</td>
</tr>
</tbody>
</table>
According to the above table, there are significant relationships between the three above stress-causing factors and the average level of stress. As observed in Table 7, 26% of the studied persons receive salaries less than 300 thousand tomans, 34% of them receive between 300 and 500 thousand tomans, and 40% of them receive more than 500 thousand tomans in month.

Table 7. The average level of stress by the amount of salary and extra pays in the studied group

<table>
<thead>
<tr>
<th>Level of stress (Amount of salary in thousand Tomans)</th>
<th>Frequency</th>
<th>Average</th>
<th>Standard deviation</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 300</td>
<td>26</td>
<td>66.57</td>
<td>13.79</td>
<td>0.16</td>
</tr>
<tr>
<td>300-500</td>
<td>34</td>
<td>64.82</td>
<td>12.21</td>
<td></td>
</tr>
<tr>
<td>More than 500</td>
<td>40</td>
<td>61.12</td>
<td>10.82</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>63.80</td>
<td>11.93</td>
<td></td>
</tr>
</tbody>
</table>

4. Discussions

In order to determined the difference in average degree of stress and demographic characteristics of the studied persons, using one-way analysis of variance test, it was revealed that there is no significant difference in the average stress level by the demographic characteristics. In a research performed by Tayebe Mehrabi, entitled “Determining the level of some job stress-causing factors among nurses”, similar results to ours were reported, except the results about the marital status. According to the results of her study, those who are “single” experience more severe stress compared with “married” nurses (12).

According to the results of this study, the male gender has the lowest percentage of low-stress persons and the female gender has the highest percentage of low-stress persons. Both genders have the same percentage of persons with medium level of stress, and the female gender contains the highest percentage of persons with high stress levels. In fact, it can be assumed that the female gender suffers from more severe stress. Another parameter investigated in this study was the level of education in the studied sample of nurses. Results show that the lowest percentage of persons with low levels of stress and also the highest percentage of persons with high levels of stress belong to the group comprised of nurses with Master degree. In addition, results of this study show that there is no significant difference in the degree of stress by the level of education. The lowest percentage of persons with low levels of stress and also the highest percentage of persons with high levels of stress belong to the group comprised of nurses who receive less than 300 thousand tomans per month.

In order to determined the difference in average degree of stress by previous record of employment, using one-way analysis of variance test, it was revealed that there is a significant difference in average degree of stress by previous record of employment, in a way that in the beginning of the employment and before the first 5-10 years, the degree of stress increases with time, and after the tenth year of employment it takes a decreasing trend with time. According to the obtained results in this study, the lowest percentage of persons with low stress levels belong to nurses, and the highest percentage of persons with low stress levels belong to the group of supervisors. Likewise, the highest percentage of persons with high stress levels belong to nurses, and the lowest percentage of persons with high stress levels belong to the group of supervisors. However, there is no significant difference in the average level of stress by the current job position (P= 0.447.). Besides, the lowest percentage of persons with low stress levels belong to those who have never had conflict with nurses, and the highest percentage of persons with high stress levels belong to those who have always had conflict with their colleague nurses. Also, the highest percentage of persons with high stress levels belong to nurses who receive more than 500 thousand tomans per month.

Conflict among colleagues showed a considerable effect on the prevalence of stress, in way that Raas believes that the relations among colleagues and their support of each other are among the factors which reduce the level of job stress. Anyway, stress in either positive or negative form, is part of everyone’s occupational life. Some job stress-causing factors are so severe that require immediate response from the person (13). According to the obtained results, nurses who have always had conflict with physicians and other nurses suffer from 100% severe stress. Similarly, in a study on job stress among nurses, French and Kaplan have introduced the conflict among colleagues as the most important job stress-causing factor (14). In the same way, Tayebe Mehrabi showed by her study that among all of the stress-causing factors, the factor of conflict with physician shows the highest statistical correlation with the total job stress (p<0.001, r= 0.753). No significant difference was observed between the average degree of stress by the mean work shift of nurses (P= 0.26). In other word, we can consider the average stress levels the same in all work shifts. However, there seems to be some differences in the average stress level by the work shift (12). The one-way analysis of variance test shows that there is a significant relationship...
between the average level of stress derived from the “lack of enough skill for providing the nursing services” and the average of “total stress” (P= 0.022), which is consistent with Tayebe Mehrabi’s results (12).

5. Conclusion
In summary, our findings show that in the begging years of employment and in nurses with low record of employment stress is severe, and after ten years of employment stress level declines. Conflict with other nurses and physicians, and also lacking enough skill for performing nursing services, are the main causes of prevalence of stress among nurses in governmental hospitals in Ilam.

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References
Case Report

Balanitis in Down syndrome - A case from Malaysia

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ABSTRACT
This case illustrates the management by a primary care physician of a child with Down syndrome who had recurrent balanitis. Various methods of management were tried. Eventually it was just by practicing proper genitalia hygiene and using the sitz bath, that actually produce success in settling the recurrent balanitis. The use of sitz bath provides an alternative in the management of balanitis will be described here.

Bibliographic Information of this article:

Keywords: Balanitis; Down syndrome; Bath; Circumcision; Phimosis; Urinary tract infection

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1. Introduction
Balanitis is neither a common cause of recurrent urinary tract infection nor a common illness among Down syndrome (12). It is not an easy job for the primary care doctor to educate a mentally challenged child with Down syndrome to do self care for balanitis. Thus it is important to teach the family members and patient a simple and practical way to solve this problem. As such, the objective of this case report is to help the family physician to identify, explore and provide other alternatives as part of more comprehensive and holistic care for these groups of patients with balanitis.

2. Case Presentation
2.1. History
A ten-year-old Indian boy came to the clinic accompanied by his mother for frequent urinary tract infection and requesting for circumcision. His mother said that he had suffered the third episodes of urinary tract infection associated with red swelling over the penile area for the past few years. There was also occasional encopresis in school or at home. The mother claimed that his condition was similar to some of his friends who had similar problem and that their condition was improved after circumcision. She hoped that her son also could go for a circumcision to avoid another episode of infection. According to his mother, he also had frequent attacks of tonsillitis associated with snoring at night.

2.2. Physical findings
On examination, he was active, moved around the room and appeared to be friendly to everyone. He had most of the features of Down syndrome. On examination of the genitalia, phimosis was noted as the foreskin was tight and difficult to retract. There was dirt under the foreskin as well. However, there was no redness or swelling at the penile area. Ear nose throat (ENT) examination showed bilateral grade 3 enlargement of the tonsils.

2.3. Investigations
His laboratory tests are shown in table 1. His urinalysis and renal profile on the first visit were normal. Urine culture and ultrasound kidney on subsequent visit also showed a normal result.

2.4. Referral
We referred him to paediatric surgeon for circumcision as we postulated the phimosis may have precipitated the frequent urinary tract infections. Unfortunately, the operation was deferred as he was suspected to
have obstructive sleep apnoea. We referred him to the ENT surgeon for tonsillectomy since the enlarged tonsils had contributed to the obstructive sleep apnoea; however mother was not keen for it.

2.5. Progress

As it is a difficult task for the child to take care of himself and he did not allow his mother to touch his genitalia, we advised the mother to put him on a sitz bath once a week as an alternative of genitalia hygiene. During the subsequent follow-up over the following 2 years, mother told us that he had no more new episode of balanitis or urinary tract infection since he practiced using the sitz baths.

Table 1. Laboratory test findings of the presented case.

<table>
<thead>
<tr>
<th>Test</th>
<th>Result</th>
<th>Range/Reference Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>UFEME: Biochemistry</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urine specific gravity</td>
<td>1.025</td>
<td>1.005-1.030</td>
</tr>
<tr>
<td>PH</td>
<td>5.0</td>
<td>5-7</td>
</tr>
<tr>
<td>Albumin</td>
<td>Negative</td>
<td>g/L</td>
</tr>
<tr>
<td>Glucose</td>
<td>Normal</td>
<td>mmol/L</td>
</tr>
<tr>
<td>Ketone</td>
<td>Negative</td>
<td>mmol/L</td>
</tr>
<tr>
<td>Nitrite</td>
<td>Negative</td>
<td></td>
</tr>
<tr>
<td>Haemoglobin</td>
<td>Negative</td>
<td>/ul</td>
</tr>
<tr>
<td>Leukocyte esterase</td>
<td>Negative</td>
<td>/ul</td>
</tr>
<tr>
<td>UFEME: Microscopy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RBC</td>
<td>Negative</td>
<td>(0-1) /ul</td>
</tr>
<tr>
<td>WBC</td>
<td>Negative</td>
<td>(0-3) /ul</td>
</tr>
<tr>
<td>Epithelial cells</td>
<td>Negative</td>
<td></td>
</tr>
<tr>
<td>Casts</td>
<td>Negative</td>
<td></td>
</tr>
<tr>
<td>Crystals</td>
<td>Negative</td>
<td></td>
</tr>
<tr>
<td>Bacteria</td>
<td>Negative</td>
<td></td>
</tr>
<tr>
<td>Others</td>
<td>Negative</td>
<td></td>
</tr>
<tr>
<td>Renal function test</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sodium</td>
<td>137</td>
<td>(136-145) mmol/L</td>
</tr>
<tr>
<td>Potassium</td>
<td>4.2</td>
<td>(3.6-5.2) mmol/L</td>
</tr>
<tr>
<td>Chloride</td>
<td>100</td>
<td>(100-108) mmol/L</td>
</tr>
<tr>
<td>Urea</td>
<td>4.8</td>
<td>(2.5-6.4) mmol/L</td>
</tr>
<tr>
<td>Creatinine</td>
<td>55</td>
<td>(62-115) µmol/L</td>
</tr>
</tbody>
</table>

3. Discussions

3.1. Why did this patient has recurrent episodes of urinary tract infection?

This patient is prone to have urinary tract infection and it could be due to several reasons:

1. **Dysfunctional voiding**: Dysfunctional voiding is defined as malfunction during the voiding phase of the micturition cycle, in which the child is contracting rather than relaxing the urethral sphincter during voiding phase. Over time, there is high pressure generated in the bladder and cause the child to urinate urgently. This can cause daytime or nighttime wetting, as well as urethral reflux and recurrent non-febrile urinary tract infection. His mother noted that he used to hold his urination and frequently ends up with daytime wetting. This could be due to a delay in his brain control over his bladder function and presented with dysfunctional voiding.

2. **Antibiotics**: Children who receive broad-spectrum antibiotics are at higher risk of getting urinary tract infections because antibiotics can alter the defense mechanism against colonization. This may explain why he had frequent urinary tract infection as he was frequently on antibiotics for the tonsillitis and it is likely have altered the gastrointestinal as well as peri-urethral flora.

3. **Constipation**: Constipation is common among Down syndrome children and studies reported children with daytime wetting and urinary tract infection had a higher rate of encopresis and constipation (3). However investigations like ultrasound of the abdomen need to be carried out to rule out kidney damage following the vesicoureteral reflux. The patient did have an ultrasound investigation and it was normal. Additional investigation like dimercapto succinic acid scan (DMSA) and micturating cystourethrogram(MCUS) were not warranted in view of the normal ultrasound and that he did not have any severe systemic symptoms (4). Circumcision is definitely warranted in him since there is underlying phimosis with balanitis. Several studies have pointed out that the incidence of urinary tract infection is higher in uncircumcised male (5-8).
3.2. What are the other indications for circumcision?

Male circumcision is one of the most common surgical procedures carried out all over the world. It is done for a number of reasons including abnormalities of foreskin and religious purpose (9). There is a lot of controversy and debate regarding its potential benefits and risks. Points against it are the procedure is not natural and it carries a small but significant morbidity and mortality, e.g. it can be associated with meatal stenosis. On the other hand, it can reduce the risk of periurethral bacterial colonization, urinary tract infections, systemic infection like septicaemia, carcinoma of the penis, and sexually transmitted disease. Other indications for circumcision include phimosis, paraphimosis (occasionally), recurrent balanitis, balanitis xerotica obliterans and serious urinary tract anomaly (9). The absolute contraindications for circumcision are hypospadias, epispadias, chordee, buried penis or micropenis (10).

3.3. When would patient with phimosis indicated for circumcision?

Phimosis is defined as presence of adhesion between the foreskin (prepuce) and glans penis, which prevents the foreskin from being retractable. The foreskin can be adherent to the glans penis and this is physiological even up to 5 years of age (9). It gradually separates until it becomes non-adherent, usually by the age of 6. Study has reported that a significant number of school-aged boys still had physiologic phimosis that resolved over time (11). True or pathologic phimosis, is present when the foreskin cannot be retracted after it has been previously retractable. In true phimosis, the margin of the foreskin and the glans penis is usually rolled and is palpably thickened due to scarring secondary to underlying inflammatory process. Phimosis can be treated by local corticosteroid cream (e.g. by applying 0.05% betamethasone valerate cream QID on the tight shiny part of the foreskin where inner skin meets the outer skin for 4 weeks duration). Circumcision is indicated if this is a true scarring, failure of foreskin to retract by 7 years old and if it causes balanitis (9).

3.4. What is balanitis?

Balanitis refers to inflammation of the glans penis whereas inflammation of the foreskin is called phthitis. Balanoposthitis is an inflammation involving both the glans and the foreskin. The symptoms of balanitis are redness, swelling of the glans, pain or discomfort, discharge under the foreskin, itchiness, unpleasant smell, phimosis or dysuria. Balanitis can be due to both infectious and noninfectious causes. It can associated with underlying skin disorder like lichen planus, eczema, dermatitis or psoriasis. Phimosis and skin irritation from chemicals can cause balanitis. Candida albicans infection with or without underlying diabetes can cause balanitis as well. Balanitis can be treated with saline bathing, a corticosteroid cream or antibacterial ointment like fucidin cream 4 times a day. It may respond to the above treatment if it is mild, but it usually settles down with circumcision (9).

3.5. Learning issues

Circumcision is the most effective way in curing balanitis in a child with phimosis. However, the circumcision was cancelled due to the underlying suspected obstructive sleep apnoea. We told his mother to let him have weekly saline sitz bath since he did not allow his mother to clean his genitalia. Since he practices the sitz bath method, he had no more attacks of balanitis for two years compared to his previous history of one attack over few months time. At the same time, we had advised the mother to encourage her son to pass urine frequently during the day time and to inform his teacher to remind him to go to toilet every now and then. She needs to make sure her son empties his bladder before going to school. In the end, she was happy because the teacher in school also told her that her son had less wetting of his pants for the following few months.

4. Conclusion

As primary care physicians who are always being the front-liner of the healthcare system, we will definitely encounter similar patients in the clinic. Prescribing sitz bath add to a comprehensive and holistic care for those groups of patients with balanitis. Future research in the role of sitz bath in managing balanitis is recommended.

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