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Info Medicus

The essence of medical practice

CONTENTS

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EDITORIAL

Dear Doctors

Welcome to our current issue of Info Medicus. We anticipate that this issue would be of immense value and will be definitely useful to you. In this issue, we have reminisced some commonly encountered problems which are crucial for practice, as well as patient care. In the present circumstances of the medical science, our main objective is to improve the knowledge base and disseminate updated information in addressing disease.

As like precious issues, we would like to begin with Disease consequences and hopefully you will find it interesting. Endometriosis has become a common problem for females, so we have discussed this topic in Health care elaborately. Blood pressure measurement assists in the overall circulation and perfusion assessment of a patient. Therefore, we have highlighted this technique in our Essential procedure.

Osteoporosis is an important health problem affecting the elderly population. This problem has great impact on society leading to escalating healthcare cost. Considering this fact, we have chosen Management of osteoporosis in our Review article section. Other regular features are there as usual.

We would appreciate your active feedback regarding our earlier issues. Your comments will assist us to improve our services. On behalf of the Medical Services Department, we hope you would enjoy this issue and do let us know if there are any topics you would like to see covered in the future.

With warm regards

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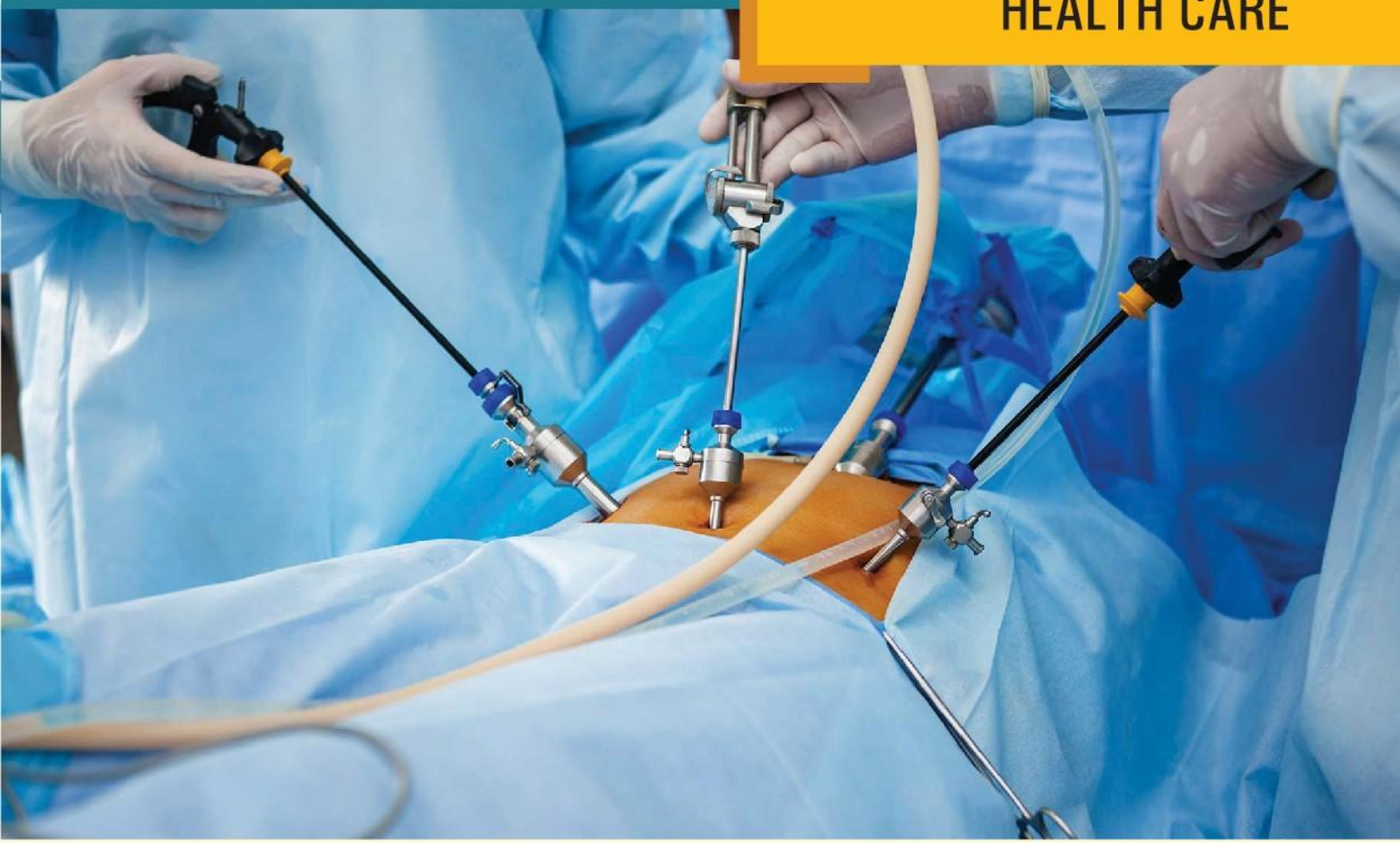


Overview of endometriosis

Endometriosis is defined as the presence of endometrial glands and stroma like lesions outside of the uterus. The lesions can be peritoneal lesions, superficial implants or cysts on the ovary or deep infiltrating disease. While there is no definitive etiology of endometriosis, there are several hypotheses regarding how endometriotic lesions develop. One possible mechanism is retrograde menstruation, a feature of the menstrual cycle in women and non-human primates, which is an outflow of the endometrial lining through the patent fallopian tubes into the pelvic space. This retrograde flow, along with potential hematogenous or lymphatic circulation, may result in the seeding of endometrial tissue in ectopic sites. Endometriosis affects 10% to 15% of all women of reproductive age and 70% of women with chronic pelvic pain. Unfortunately, for many of these women, there is often a delay in diagnosis of endometriosis resulting in unnecessary suffering and reduced quality of life. In patients aged 18 to 45 years, the average delay is 6.7 years. As most women with endometriosis report the onset of symptoms during adolescence, early referral, diagnosis, identification of disease and treatment may mitigate pain, prevent disease progression and thus preserve fertility. Barriers to early diagnosis include the high cost of diagnosis and treatment in adolescent patients and presentation of confounding symptoms such as cyclic and acyclic pain. Thus, a non-invasive tool to diagnose endometriosis could facilitate earlier diagnosis and intervention that could ultimately improve quality of life and preserve fertility.

Risk factors

Several reproductive factors have been consistently associated with risk for endometriosis (Table-1), suggesting that hormonal variation may have a significant impact on the risk of developing endometriosis. For instance, early age at menarche and short menstrual cycle length are associated with an increased risk, while parity and current oral contraceptive use are associated with a decreased risk. Circulating estradiol and estrone, which stimulate ectopic and eutopic endometrial tissue, are higher among women at an earlier age of menarche and in nulliparous women. Though not a reproductive risk factor, a consistent inverse association has also been observed between body mass index (BMI) and endometriosis and may also relate to hormonal differences between heavy and lean women.

Table-1: Risk factors for endometriosis
Factors associated with increased risk
• Earlier age at menarche
• Shorter menstrual cycle length
• Taller height
• Alcohol use
• Caffeine intake
Factors associated with decreased risk
• Parity
• Current oral contraceptive use
• Smoking
• Higher body mass index
• Regular exercise
• Fish and omega-3 fatty acids

Diagnosis

Clinical diagnosis

It is often made by the classic symptoms of progressively increasingly secondary dysmenorrhea and infertility. This is corroborated by the pelvic findings.

Speculum examination: Bluish powder burn-lesions may be seen on the cervix or the posterior fornix of the vagina. These are tender and sometime may bleed

Bimanual examination: Reveal nodularity in the pouch of douglus, Nodular feel in the uterosacral ligaments, fixed retroverted uterus, and unilateral and bilateral adnexal mass (chocolate cysts).

Serum marker: Cancer antigen (CA)-125-a moderate elevation of serum CA 125 is noticed in patients with severe endometriosis. It is not specific for endometriosis, as it is significantly increase in epithelial ovarian carcinoma. However, it is helpful to assess the therapeutic response and in follow up of cases and to detect any recurrence after therapy. Monocyte Chemotactic Protein (MCP-1) level is increased in the peritoneal fluid of women with endometriosis.

Imaging

Ultrasonography: Transvaginal scan (TVS) can detect ovarian endometriomas. TVS and endorectal ultrasound (ERUS) are found better for rectosigmoid endometriosis.

Magnetic resonance imaging (MRI): It is a diagnostic tool. There is a characteristic hyperintensity on T1 weighted images and a hypointensity on T2 weighted images.

Computed tomography (CT): It is better compared to ultrasonography in the diagnosis. MRI is useful for deep infiltrating endometriosis.

Laparoscopy: It is the gold standard among other investigations. Confirmation is done by double puncture laparoscopy or by laparotomy. Other benefits of laparoscopy are the assessment of the leision can be done with site, size and extent, biopsy can be taken at the same time, staging can be done, extent of adhesions can be recorded and if necessary there is an opportunity to do laparoscopic surgery.

Intravenous urography: It is useful in cases with deep infiltrating endometriosis (DIE) and suspected ureteric involvement.

Treatment

Combined estrogen and progestin therapy: The use of oral contraceptives that combine estrogen and progestin is considered first line treatment for pelvic pain associated with endometriosis. Preventing withdrawal bleeding may improve the efficacy of oral contraceptives for relief of pain associated with endometriosis.

Oral progestin therapy: Estrogen stimulates endometriotic growth. Since oral contraceptives contain both estrogen and progestin, progestins alone have been used for the management of chronic pain in patients with endometriosis. It includes norethindrone acetate and dienogest for relieving dysmenorrhea related to endometriosis.

Depot progestin therapy: It is effective in relieving pelvic pain in up to three quarters of patients and is a very economical alternative in the treatment of symptomatic endometriosis. Prolonged delay in resumption of ovulation is a possibility and therefore it should not be suggested for women wanting a pregnancy.

Intrauterine progestin releasing system: Levonorgestrel, a potent progestin has been shown to have potent anti-estrogenic effects on the endometrium. In recent studies patients with endometriosis and chronic pelvic pain were very satisfied with the treatment.

Analgesics: Management of pain associated with endometriosis with targeted medical therapies may require at least 1 cycle to initiate pain relief. When GnRH agonist therapy does not prevent dysmenorrhea, it is appropriate to provide analgesia in the form of NSAID or even opioids to make the patient more comfortable.

References: 1. J. of Obs. And Gyn., Vol. 32, N. 7
2. Curr. Obs. Gyn. Rep.; 2017, Vol. 34, N. 6
3. DC Dutta's Textbook of Gynecology, 7th edition

Connection

of hearing loss to other health conditions

Hearing loss may signal other important health issues

Cardiovascular disease (CVD)

The ear can be a window to the heart therefore hearing loss links with CVD

Depression

Use of hearing aid can reduce depression and thereby improves quality of life

Dementia

Dementia risk may be up to 5 times higher with hearing loss

Falling

Hearing loss is tied to 3 times risk of falling

Hearing loss

is connected to other health conditions

Diabetes

Hearing loss is twice as likely for those with diabetes

Chronic kidney disease (CKD)

Patients with moderate CKD are associated with 43% increased risk of hearing loss

Hospitalization

It is 32% more likely for older adults to be hospitalized with hearing loss

Mortality

Hearing loss is tied to greater risk of death for old aged men

Blood pressure measurement technique

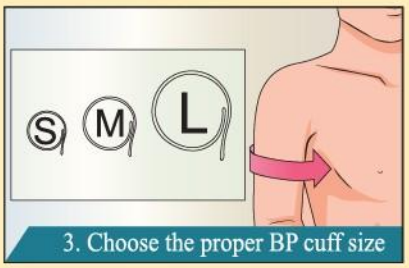
Blood pressure is the amount of pressure exerting on the walls of blood vessels within the body, measured in mmHg. Diagnosis and treatment of hypertension depend on accurate measurement of auscultatory blood pressure. Blood pressure measurement is indicated in any situation that requires assessment of cardiovascular health including screening for hypertension and monitoring the effectiveness of treatment in patients with hypertension. The measurement of blood pressure is important in the diagnosis and monitoring of a wide range of clinical conditions. Traditionally, blood pressure is measured non-invasively using the auscultatory technique (Korotkoff sounds) with the pressure in the cuff measured using a sphygmomanometer. It involves calculating the pressure during the contraction (systole) and relaxation (diastole) of the heart. It involves feeling the pulse or listening to the heart beat whilst an inflatable cuff is wrapped around the arm and inflated, showing a reading on the attached sphygmomanometer. The measurement of blood pressure is an important consideration because it requires a certain level of skill, an appropriate setting and well maintained and calibrated equipment. A measurement should be based on at least two readings.

1. Choose the right equipment

- A quality stethoscope
- An appropriately sized blood pressure cuff
- A blood pressure measurement instrument such as an aneroid sphygmomanometer

2. Prepare the patient

Make sure that the patient is relaxed and is sitting in an upright position with upper arm leveled with the heart. Talking increases blood pressure so the patient should refrain from talking during BP reading. Be sure to remove any excess clothing that might overlap with the BP cuff or constrict blood flow in the arm.



3. Choose the proper BP cuff size

If possible, measure the patient's arm circumference to determine the appropriate cuff size. Most BP cuffs have a range area located on the inside of the cuff. If there is no tape measure available, simply wrap the cuff around the patient's arm and use the index line to determine.

4. Place the BP cuff on the patient's arm

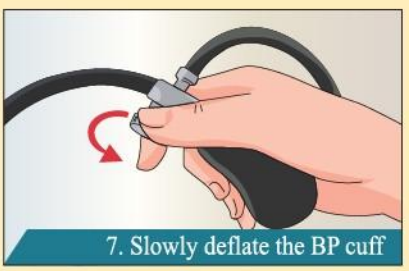
Another important factor for acquiring an accurate blood pressure reading is proper BP cuff placement. First, palpate or locate the brachial artery (a). Position the BP cuff so that the artery marker points to the brachial artery. Wrap the BP cuff snugly around the arm making sure that the cuff is a couple of centimeters above the elbow crease (b).

5. Position the stethoscope

Check to ensure that the stethoscope ear pieces are angled forward. On the same arm palpate the antecubital fossa to locate the strongest pulse sound and place the bell of the stethoscope over the brachial artery at this location.

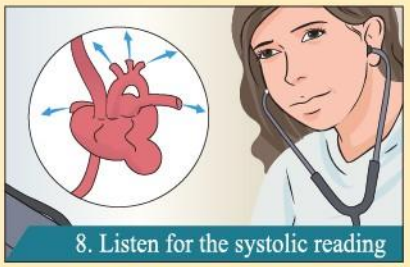
6. Inflate the BP cuff

Before starting inflation, check that there are no kinks in the cuff hose and make sure that the cuff connectors are properly or tightly fastened. For a sphygmomanometer, close the air release valve by turning it clockwise. Inflate cuff listening to heart beat and stop inflating after the heartbeat disappears. The gauge should read 30 to 40 mmHg above the person's normal BP reading. If this value is unknown then inflate the cuff to 160 to 180 mmHg.



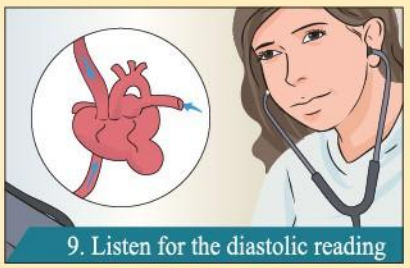
7. Slowly deflate the BP cuff

The cuff deflate gradually by opening the airflow valve (twisting the screw counterclockwise). The American Heart Association (AHA) recommends that the pressure should fall at 2 to 3 mmHg per second, anything faster may likely result in an inaccurate measurement.



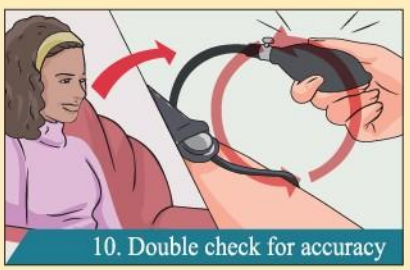
8. Listen for the systolic reading

The first occurrence of rhythmic sounds heard as blood begins to flow through the artery is the patient's systolic pressure and may resemble a tapping noise at first. This will be the systolic reading.



9. Listen for the diastolic reading

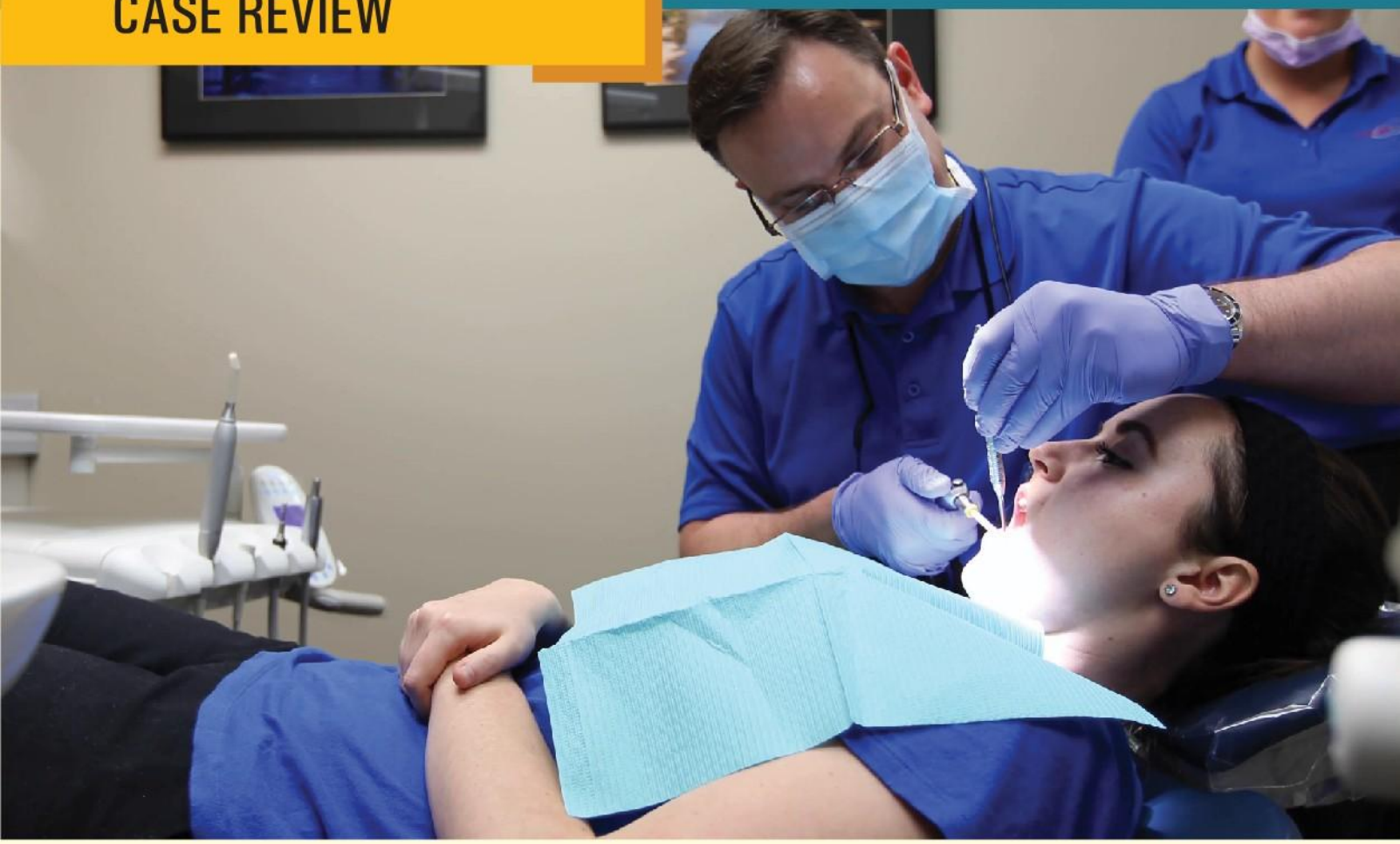
Continue to listen as the BP cuff pressure drops and the sounds fade. Note the gauge reading when the rhythmic sounds stop. This will be the diastolic reading.



10. Double check for accuracy

The AHA recommends taking a reading with both arms and averaging the readings. To check the pressure again for accuracy and wait about five minutes between readings. Typically, blood pressure is higher in the mornings and lower in the evenings. If the blood pressure reading is a concern or masked or white coat hypertension is suspected, a 24 hour blood pressure study may be required to assess the patient's overall blood pressure profile.

Reference: American Heart Association (AHA)



Periodontal plastic surgery

A 28 year old female patient, nonsmoker, was referred to the clinic of periodontics in April 2011. She came for consultation because she felt pain when brushing and has hypersensitivity to thermal changes on the labial area of an anteroinferior tooth. The patient underwent orthodontic treatment between 2006 and 2010. The symptoms she relates started after such treatment. Upon examination miller's class II gingival recession (Figure-1), localized gingival inflammation, thin periodontal biotype, lack of attached gingiva was observed. The diagnosis and treatment plan was explained in detail to the patient. One of the treatment options were basic periodontal therapy and periodontal plastic surgery therapy by means of a connective tissue graft. The basic therapy includes instructing the patient regarding dental plaque control, tartar removal, prophylaxis and use of a soft toothbrush and of the necessary interproximal cleaning devices for each sector. This therapy lasts four sessions.

Other plastic surgery treatment options such as xenografts and homografts and their advantages and disadvantages were also explained. The plastic surgery therapy selected was coronal repositioning of flap by means of a connective tissue graft taken from the palate. The surgical procedure was performed under local anesthesia. A partial thickness flap was placed, with two vertical releasing incisions. The exposed root was mechanically prepared and irrigated with saline (Figure-2). A connective tissue graft was taken from the palate (Figure-3). The graft was sutured on the recipient site using Vicril 5-0 suture (Figure-4). The flap was repositioned over the graft to cover it completely, 2 mm above the cementoenamel junction (Figure-5) by Nylon 5-0 suture. The sutures were removed 14 days after the procedure, and the patient was prescribed chlorhexidine gluconate 0.12% orally twice a day. Two years after the treatment, gingiva stability and thickness seem adequate, which shows good hygiene of the sector and gingival tissue stability achieved with the graft (Figure-6). The patient was grateful and satisfied with the treatment.

Discussion

The use of both connective tissue grafts and their replacements by xenografts or homografts, might enable to modify the thickness of gingival tissue. In this case, the use of a connective tissue graft

made it possible to modify the thickness of the gingival tissue. No complications were reported on any of the surgical sites. Connective tissue from the palate was used for three reasons, it is the gold standard, the donor site was good and the described patient herself selected such option. Coronally advanced flap without graft would not be indicated in this case as the gingival tissue was very thin.

The patient has adopted good hygiene practices, as seen in the periodontal checkups conducted every 4 months. Dental plaque is removed professionally, which has also contributed to the positive outcomes achieved. A recession reduction of at least 70% can be expected 2 or more years after the treatment. The literature describes better outcomes with maxilla grafts, where vestibular depth, flap tension and flap thickness are more favorable. Selecting the best treatment according to scientific evidence leads to excellent clinical results. The biotype was modifiable on the surgical site with the connective tissue graft, which resulted in the stability of the area. This was aided by the fact that the patient presented good dental plaque control practices.

Different surgical techniques are proposed for grafts such as the envelope technique, reposition of the flap partially covering a connective graft with an epithelial border, coronally advanced flaps with vertical releasing incisions. A coronally advanced flap with vertical releasing incisions was chosen and given the local anatomic characteristics. The exposed root in the recession area was treated with curettes, as there are no differences between this and other treatment. By using connective tissue grafts or epithelial connective grafts, the formation of a long junctional epithelium with a fibrous attachment can be achieved. New cementum was formed only in the areas where the cementum was preserved.

According to the American Academy of Periodontology, gingival recession is defined as the exposure of the tooth root caused by the migration of the gingiva to a point apical to the cementoenamel junction. This frequently compromises dental and gingival aesthetics, and causes dental hypersensitivity. It can appear in its localized or generalized form. There are four types of factors that aid the development of gingival recession: anatomical factors (lack of keratinized gingiva, muscle insertion close to gingival margin, inadequate tooth alignment, thin or absent vestibular table, prominent root); factors relative to inflammatory disease (e.g., gum disease because of plaque build-up, periodontitis); factors relative to iatrogenesis (e.g., prosthetics, orthodontic treatment); factors relative to trauma (e.g., traumatic brushing or other mechanical traumas).

The elimination of causal factors and the detailed explanation provided to the patient are as important as the periodontal plastic surgery technique to implement. The most widely accepted classification of gingival recession is Miller's. It is based on the most apical gingival margin of the recession regarding the mucogingival junction, and on the amount of tissue loss (e.g., gingiva and bone) in interproximal areas adjacent to the recession site.

Complete coverage is achieved when the gingival margin is placed at the same level as the cementoenamel junction, the gingival sulcus has a probing depth lower than 2 mm and when there is no bleeding on probing. Connective tissue grafts are considered the gold standard in periodontal plastic surgery given their predictability, stability over time, increase in thickness and length of keratinized gingiva. In 2015, the Workshop on Regeneration organized by the American Academy of Periodontology showed that the tissue thickness achieved when using connective tissue grafts has more stable outcomes over time and there is lower recurrence of gingival recession.


Figure-1


Figure-2


Figure-3


Figure-4

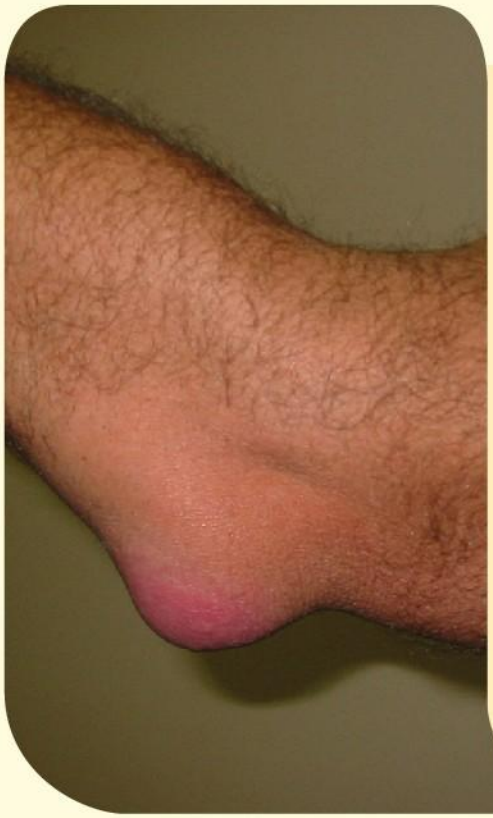

Figure-5


Figure-6

Conclusions

Basic periodontal therapy is fundamental when treating gingival recession. Sub epithelial connective tissue grafts are the gold standard in periodontal plastic surgery as they modify tissue thickness, increase keratinized gingiva and improve root coverage. Periodontal maintenance is essential to avoid inflammatory events which might increase recession recurrence.

Reference: Odontoestomatologia, May 2016, Vol. 18, N. 27



Gout nodulosis

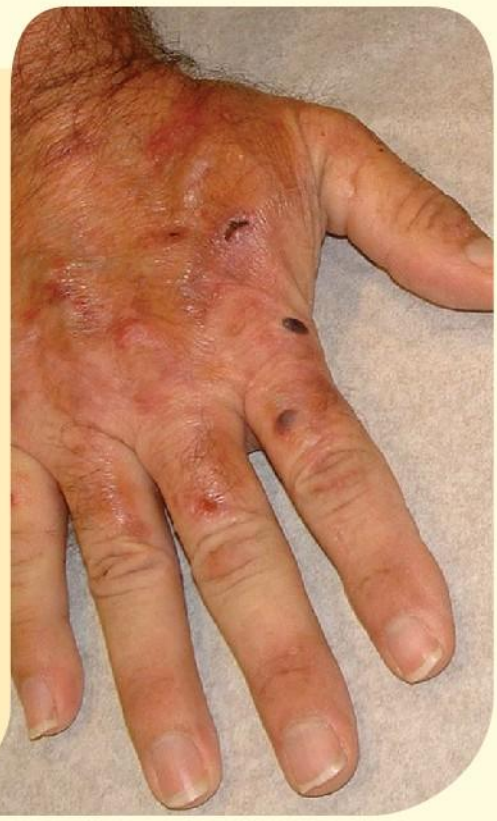
A 70 year old man presented for evaluation of tender masses over each elbow that had been gradually enlarging for several years. There was no history of joint pain. Physical examination was done and revealed a large, erythematous, fluctuant, subcutaneous mass covering each olecranon process. On laboratory examination, the serum uric acid level was normal (202 mmol/l, reference range 120 to 420 mmol/l), but the serum C-reactive protein level was elevated (105 mg/l, reference range 0 to 5). There was no evidence of erosive arthritis on plain radiographs of the elbows. Biopsy of each mass revealed fibrovascular tissue with multinucleated giant cells and calcifications. Monosodium urate crystals were identified on polarized microscopical examination of the biopsy specimen. The patient received a diagnosis of gout nodulosis, a rare presentation of gout in which nodular tophi form in the absence of gouty arthritis. Treatment with allopurinol did not result in any clinically significant reduction in symptoms on repeat examination 6 months later. The patient declined to undergo surgical excision of the lesions.

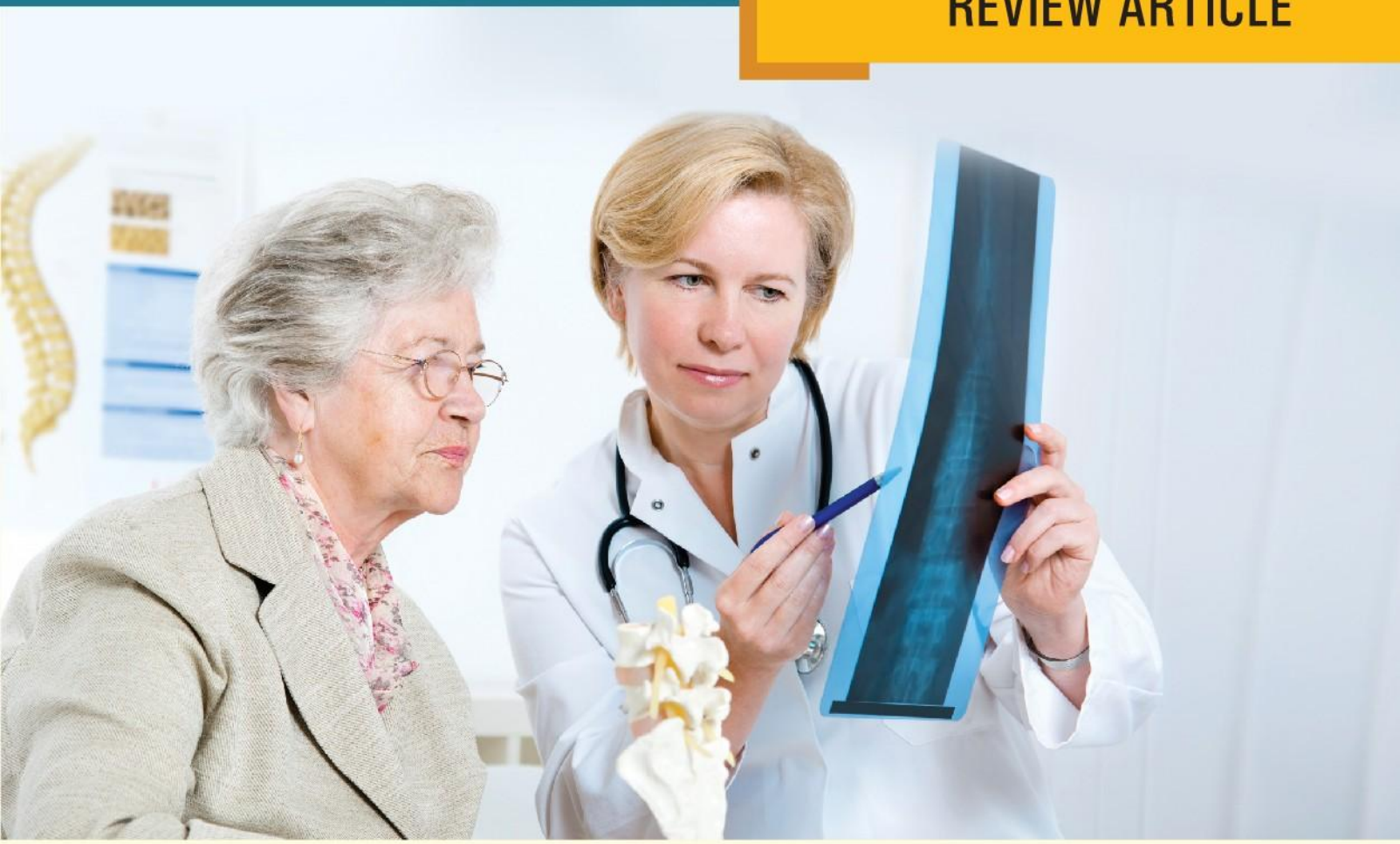
Reference: N. Eng. J. Med., September 15, 2011; Vol. 365, N. 11

Porphyria cutanea tarda

A 51 year old man with a history of heavy alcohol use, chronic hepatitis C virus (HCV) infection and hepatic cirrhosis presented to his physician with an 8 months history of periorbital hair growth. On examination, healing crusts and scars were evident in sun exposed areas. He described skin photosensitivity and intermittent painful blistering over the nape of the neck, the forearms and the back of the hand. The patient's urine had pink fluorescence under a Wood's lamp, suggesting the presence of uroporphyrin. A diagnosis of porphyria cutanea tarda was confirmed when marked uroporphyrinuria was shown on laboratory analysis. Porphyria cutanea tarda results from decreased activity of the uroporphyrinogen decarboxylase enzyme. Although the mechanism is unknown, the sporadic form of the disease is strongly associated with chronic HCV infection. Facial hypertrichosis is common and may serve as a diagnostic clue. Although treatment of the patient's chronic HCV infection was considered inadvisable by his hepatologist, low dose oral hydroxychloroquine, skin photoprotection and alcohol cessation successfully controlled the cutaneous eruptions within 6 months.

Reference: N. Eng. J. Med., September 22, 2011; Vol. 365, N. 12





Management of osteoporosis

Introduction

Osteoporosis is the most common bone disease. It has been estimated that more than 8.9 million fractures occur annually worldwide and most of these occur in patients with osteopenia or osteoporosis. About one third of all women and one fifth of men aged 50 and above suffer fractures at some point in life. The burden of osteoporosis related fractures is predicted to increase by two to threefold by 2050 on a worldwide basis, due to ageing of the population. Osteoporosis is under diagnosed and under treated in Asia and the Indian subcontinent, particularly in rural areas, due to low provision of technologies like DEXA, which are required to make the diagnosis. Fractures in patients with osteoporosis can affect any bone but common sites are the forearm (Colles' fracture), spine (vertebral fractures), humerus and hip. All of these fractures become more common with increasing age. Since only about one third of vertebral fractures come to medical attention (clinical vertebral fractures), the true number of patients with vertebral fracture is much greater than that. Of these, hip fractures are the most serious and have an immediate mortality of about 12% and a continued increase in mortality of about 20% when compared with age matched controls. Treatment of hip fracture accounts for the majority of the health care costs associated with osteoporosis. The trouble is osteoporosis is a "silent disease", because there are no symptoms prior to a fracture. However, once a person has broken a bone, their risk of breaking another fragility fracture increases significantly. After the first break, one in eight will break another bone within a year and a quarter within five years. This article reviews the available nonpharmacologic and pharmacologic interventions proved to be effective that may be implemented to reduce the risk of osteoporotic fractures.

Pathophysiology

Osteoporosis is classified as primary and secondary. Primary osteoporosis by convention is of relatively unknown origin that occurs with aging and accelerates with menopause or andropause. There is no direct or singular cause for primary osteoporosis but there are several clinical risk factors. Secondary osteoporosis is the consequence of conditions such as hormonal imbalances, diseases or medications. It is increasingly being recognized that multiple pathogenetic mechanisms operate in the development of the

osteoporotic state. The hallmark of osteoporosis is a reduction in skeletal mass caused by an imbalance between bone resorption and bone formation. Under physiologic conditions, bone formation and resorption are in a fair balance. A change in either that is increased bone resorption or decreased bone formation may result in osteoporosis.

Osteoclasts derived from mesenchymal cells are responsible for bone resorption, whereas osteoblasts from hematopoietic precursors are responsible for bone formation. These two types of cells are dependent on each other for production and linked in the process of bone remodeling. Osteoblasts not only secrete and mineralize osteoid but also appear to control the bone resorption carried out by osteoclasts. Osteocytes which are terminally differentiated osteoblasts embedded in mineralized bone, direct the timing and location of bone remodeling. In osteoporosis, the coupling mechanism between osteoclasts and osteoblasts is thought to be unable to keep up with the constant micro trauma to trabecular bone. Osteoclasts require weeks to resorb the bone, whereas osteoblasts need months to produce new bone. Osteoclasts resorbs the bone matrix by secreting hydrochloric acid which dissolves calcium phosphate and enzymes such as collagenase and other proteases.

Therefore, any process that increases the rate of bone remodeling results in net bone loss over time. Furthermore, in periods of rapid remodeling (e.g., after menopause), bone is at an increased risk for fracture because the newly produced bone is less densely mineralized, the resorption sites are temporarily unfilled and the isomerization and maturation of collagen are impaired. The difference between a normal and osteoporotic bone is given in Figure-1.

The receptor activator of nuclear factor-k B ligand (RANKL) or receptor activator of nuclear factor-k B (RANK) or osteoprotegerin (OPG) system is the final common pathway for bone resorption. Osteoblasts and activated T cells in the bone marrow produce the RANKL cytokine. RANKL binds to RANK expressed by osteoclasts and osteoclast precursors to promote osteoclast differentiation. Osteoprotegerin is a soluble decoy receptor that inhibits RANK-RANKL by binding and sequestering RANKL.

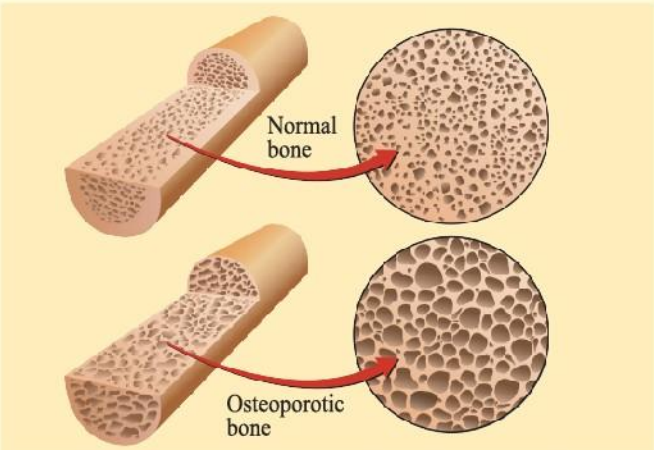


Figure-1: Difference between normal bone and osteoporotic bone

Other forms of osteoporosis include pregnancy associated osteoporosis which is a rare form of osteoporosis that typically presents with back pain and multiple vertebral fractures during the second or third trimester. The cause is unknown but may relate to an exaggeration of the bone loss that normally occurs during pregnancy in patients with pre-existing low bone mass.

Risk factors

The risk factors for osteoporosis are well recognized. The key risk factors for fractures are:

1. Nonmodifiable
2. Potentially modifiable

Nonmodifiable risk factors of osteoporosis includes-

- Advanced age (≥ 50 years)
- Female sex
- White or Asian ethnicity
- Genetic factors as family history of osteoporosis
- Dementia

Potentially modifiable risk factors of osteoporosis includes-

- Cigarette smoking
- Low body weight (< 58 kg or 127 lb)
- Recurrent falls
- Inadequate physical activity
- Estrogen deficiency
- Alcohol use
- Early menopause
- Prolonged premenopausal amenorrhea
- Androgen or estrogen deficiency
- Calcium deficiency
- Poor health

There are other secondary causes of osteoporosis that are shown in Table-1.

Diagnosis

Patient with osteoporosis need medical attention because of low trauma fragility fracture. In most of the cases osteoporosis is asymptomatic so diagnosis is made by mainly laboratory investigations.

Clinical features

Osteoporosis does not cause symptoms until a fracture occurs. Non vertebral fractures are almost always caused by a traumatic event, most usually a simple fall. The term 'fragility fracture' is used to describe a fracture that occurs as the result of a fall from standing height or less. These are typical of osteoporosis. It is important to

remember that the majority of people who suffer a fragility fracture do not have osteoporosis; some have normal bone density but most have osteopenia. The clinical signs of fracture are pain, local tenderness and deformity. In hip fracture, the patient is (with rare exceptions) unable to weight bear and has a shortened and externally rotated limb on the affected side. The presentation of vertebral fractures is variable. Some patients present with acute severe back pain. In others the presentation is with height loss and kyphosis in the absence of pain or with chronic back pain. Sometimes the presentation of osteoporosis is with radiological osteopenia or as a vertebral deformity on an X-ray that has been performed for other reasons..

Table-1: Causes of secondary osteoporosis

Endocrine
Thyrotoxicosis
Cushing's syndrome
Hyperprolactinemia
Hyperparathyroidism
Hypogonadism
Nutritional
Inflammatory bowel disease
Chronic liver disease
Coeliac disease
Anorexia nervosa
Vitamin D deficiency
Drugs
Long term corticosteroid use
Phenytoin
Phenobarbitone
Overtreatment with thyroxine
Diuretics such as bendrofluazide
Others
Rheumatoid arthritis
Multiple myeloma
Metastatic carcinoma
Renal disease

Investigations

Patients with any risk factors should be considered for DEXA scanning, particularly if there are one or more risk factors for fractures. DEXA is regarded as the gold standard technique for diagnosis. Other modalities used include radiography which is useful for selection of patients in need of screening or formal diagnosis. To identify treatable underlying causes the some screening tests are also indicated in patients suffering from osteoporosis. Figure-2 shows algorithm for the investigation of patients with suspected osteoporosis.

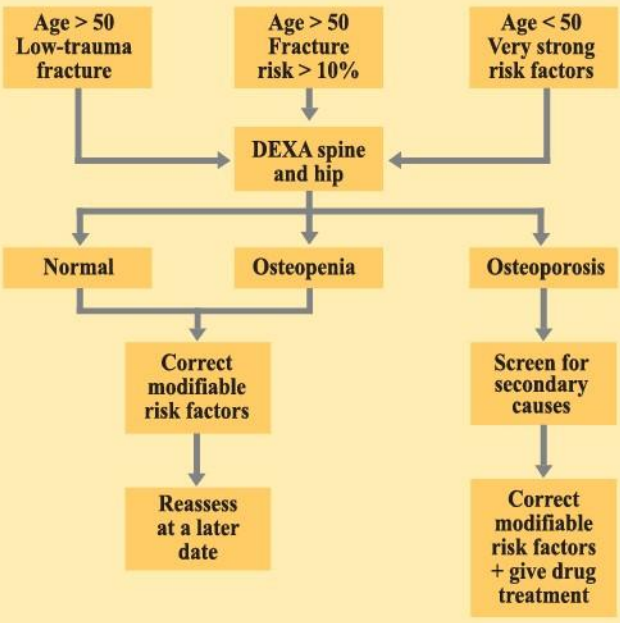


Figure-2: Algorithm for the investigation of patients with suspected osteoporosis

DEXA scan: Osteoporosis is usually diagnosed by measuring bone mineral density (BMD) by dual energy X-ray absorptiometry (DEXA). The World Health Organization (WHO) has developed a scale for women, which provides a T-score and considers history of previous fracture. This scale is described in Table-2. In most cases the hip is the preferred site for determining BMD, although for early postmenopausal or drug induced osteoporosis the spine is the preferred site for BMD assessment alone has high specific but low sensitivity for fracture risk. For this reason it is not appropriate to carry out general screening of all patients at a particular age; instead referral for a DEXA scan (Figure-3) should be made for patients with risk factors for osteoporosis. Bone density values in individuals can be expressed in relation to a reference population in standard deviation (SD); when compared to the young healthy population, this measurement is referred to as the T-score.

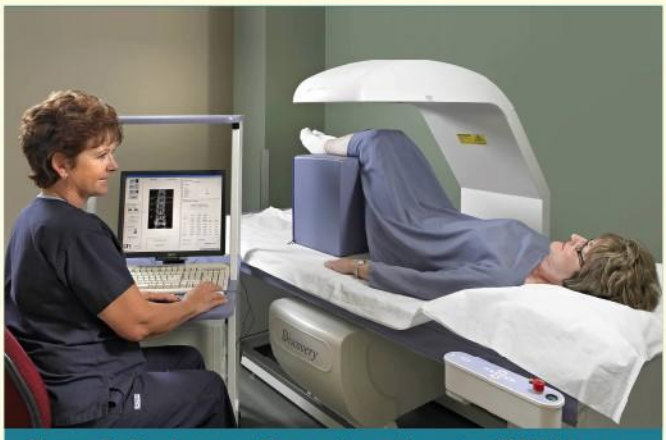


Figure-3: Dual energy X-ray absorptiometry (DEXA) scan

Table-2: WHO bone mineral density scale		
Category	**Description**	**T-score**
Normal	A value of BMD within 1 standard deviation of the young adult reference mean	≥ -1
Low bone mass (Osteopenia)	A value of BMD more than 1 standard deviation below the young adult mean, but less than 2.5 standard deviations below the value	< -1 and > -2.5
Osteoporosis	A value of BMD 2.5 standard deviations or more below the young adult mean	≤ -2.5
Severe osteoporosis (established osteoporosis)	A value of BMD 2.5 standard deviations or more below the young adult mean in the presence of one or more fragility fractures	≤ -2.5 (+ fragility fracture)

Imaging: Radiography is useful for selection of patients in need of screening or formal diagnosis. Compression fracture of spine is common in osteoporotic patient which is diagnosed by plain X-ray of spine which is given in Figure-4. CT scan and MRI of the spine are used for diagnosis osteoporosis.

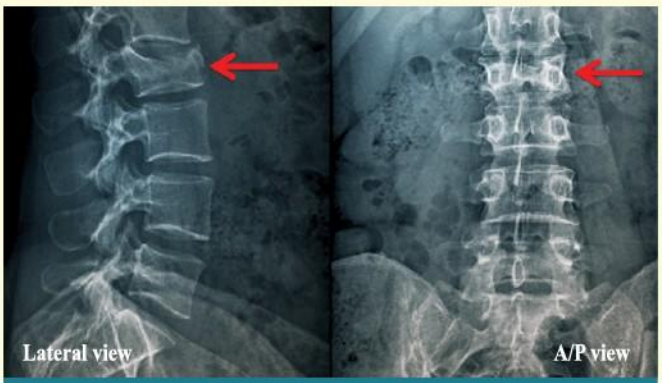


Figure-4: Compression fracture of spine caused by osteoporosis

Others: To identify treatable underlying causes the following screening tests are indicated in patients suffering from osteoporosis.

- CBC and ESR
- Urea and electrolyte
- Liver function test
- Thyroid function test
- Serum calcium
- Alkaline phosphatase
- Testosterone or gonadotrophins in men
- Serum immunoglobulins and paraproteins
- Urinary Bence-Jones' proteins

Treatment

Treatment for osteoporosis should include not only drug treatment but also advice on lifestyle, nutrition, exercise and measures to reduce falls. Ensure adequate calcium intake and vitamin D status, prescribing supplements if required. The aim of treatment is to reduce the risk of fracture and this can be achieved by a combination of approaches.

Non-pharmacological interventions

Fall prevention: A multifactorial approach that addresses vision deficits, balance and gait abnormalities, cognitive impairment and dizziness is thecornerstone of fall prevention. Improving lighting, removing loose rugs and adding grab bars near bathtubs, toilets and stairways can enhance safety. Formal home safety evaluations and physical therapy treatments are beneficial. Eliminating medications that can affect alertness and balance is critical. The use of hip protectors is no longer considered effective.

Calcium: The results of studies examining the effectiveness of calcium on fracture risk are mixed but one subgroup from a recent meta-analysis showed decreased fracture rates in older women with 80% or greater adherence to calcium supplementation. A daily intake of at least 1,200 mg of calcium is recommended for all women with osteoporosis. Most postmenopausal women consume inadequate amounts of dietary calcium; therefore, supplementation is needed. For optimal absorption, a single dose of calcium supplement should contain 500 mg or less of elemental calcium, necessitating multiple daily doses. Calcium carbonate is the least expensive, requires acid for absorption and should be taken with meals. Calcium citrate is more expensive and does not need to be taken with meals. All calcium supplements may cause constipation and gastrointestinal upset. The absorption of numerous medications, most notably levothyroxine, fluoroquinolones, tetracycline, phenytoin, angiotensin converting enzyme inhibitors, iron and bisphosphonates can be significantly decreased when given with calcium. These medications should be given several hours before or after calcium supplements.

Vitamin D: The National Osteoporosis Foundation recommends 800 to 1,000 IU of vitamin D daily for persons 50 years and older. Daily intake of at least 700 to 800 IU of vitamin D is shown to prevent hip fractures in older persons, with a number needed to treat (NNT) of 45 over two to five years of treatment. Because it is difficult to consume this amount of dietary vitamin D, supplementation is important. For patients with documented

vitamin D deficiency, oral ergocalciferol (vitamin D) in a dosage of 50,000 IU weekly for eight weeks is usually an effective treatment. This should be followed by a maintenance dosage of 50,000 IU every two to four weeks or oral cholecalciferol (vitamin D) in a dosage of 1,000 IU once daily. The goal of treatment is a sustained serum 25-hydroxyvitamin D level greater than 30 ng per ml. Measurement of serum levels following treatment is important because of the possible risk of vitamin D toxicity, but the optimal interval for testing is not known. Multiple alternative strategies for treating vitamin D deficiency exist.

Pharmacological interventions

Several drug treatments are now available to reduce the risk of fracture in osteoporosis.

Bisphosphonates: Bisphosphonates are the mainstay of treatment for osteoporosis. They are however, poorly absorbed and need to be taken separately from food. They may cause oesophageal irritation and should be taken by the patient sitting up with plenty of water. Etidronate was the first but has been superseded by the more powerful alendronate and risedronate, both of which can be taken daily or weekly and the newer ibandronate that can be taken monthly.

The bisphosphonate is released within the osteoclasts and impairs bone resorption. This in turn causes an increase in bone density but this is principally due to increased mineralization of bone, rather than an increase in bone mass. Bisphosphonates reduce the risk of fracture in patients with osteoporosis but do not completely prevent fractures occurring. Oral bisphosphonates are typically given for a period of 5 years, at which point the need for continued therapy should be evaluated, with a repeat DEXA if possible. If patients have remained free of fractures after 5 years and if BMD levels have increased and no longer remain in the osteoporotic range, it is usual to instigate a 5 year spell off therapy. Treatment may be continued for up to 10 years in patients whose BMD levels remain in the osteoporotic range after 5 years.

A change in treatment should be considered in patients who have lost BMD despite oral bisphosphonates (more than 4%). Most commonly, this will be a switch to parenteral zoledronic acid but teriparatide can also be considered in those with severe spinal osteoporosis. With intravenous zoledronic acid, 3 years of therapy is equivalent to 6 years in terms of fracture risk reduction and many experts recommend periods of 3 years on and 3 years off treatment to reduce the risk of over suppression of bone turnover. Oral bisphosphonates are poorly absorbed from the gastrointestinal tract and should be taken on an empty stomach with plain water, no food should be eaten for 30 to 45 minutes after administration. Different options of bisphosphonate are given in Table-3.

Table-3: Different options of bisphosphonate

Alendronate
• Can increase bone mass and reduce chances of spine, hip and other fractures
• Available in daily and weekly doses
Zoledronic acid
• Can increase bone mass and reduce chances of spine, hip and other fractures
• Available as an intravenous injection given once yearly

Denosumab: Denosumab is a monoclonal antibody that reduces osteoclast activity which is administered by subcutaneous injection of 60 mg every 6 months in the treatment of osteoporosis and has similar efficacy to zoledronic acid. It may be a suitable option in women who are unable to comply with instructions for alendronate and either risedronate or etidronate.

Calcium and vitamin D: Combined calcium and vitamin D supplements have limited efficacy in the prevention of osteoporotic fractures when given alone but are widely used as an adjunct to other treatments. A typical daily dosage is 1000 mg calcium and 800 IU vitamin D. Calcium and vitamin D supplements have efficacy in preventing fragility fractures in elderly or institutionalized patients who are at high risk of deficiency. Vitamin D supplements alone do not prevent fractures in osteoporosis but there is evidence that the response to bisphosphonates is blunted in patients with vitamin D deficiency.

Teriparatide: Teriparatide is the 1 to 34 fragment of human PTH. It is an effective treatment for osteoporosis which works by stimulating new bone formation. Although teriparatide also stimulates bone resorption, the increase in bone formation is greater, resulting in increased bone density, particularly at sites rich in trabecular bone such as the spine. It is given by a self-administered subcutaneous injection in a dose of 20 µg daily for 2 years. At the end of this period, bisphosphonate therapy or another inhibitor of bone resorption should be administered to maintain the increase in BMD. Teriparatide and oral bisphosphonates should not be given in combination.

Abaloparatide: Abaloparatide is the 1 to 34 fragment of PTH related protein. It works in a similar way to teriparatide to stimulate bone formation. It is given as a self-administered injection of 80 µg daily for 18 months. At the end of this period an inhibitor of bone resorption should be given to maintain the increase in bone mass. Efficacy has been demonstrated for the prevention of vertebral fractures with effects similar to those of teriparatide.

Hormone replacement therapy (HRT): Cyclical HRT with oestrogen and progestogen prevents post-menopausal bone loss and reduces the risk of vertebral and non-vertebral fractures in post-menopausal women. It is primarily indicated for the prevention of osteoporosis in women with an early menopause and for treatment of women with osteoporosis in their early fifties who have troublesome menopausal symptoms. It is not recommended above the age of 60 because the risk of an increased risk of breast cancer, cardiovascular disease and venous thromboembolic disease.

Raloxifene: Raloxifene, a selective estrogen receptor modulator is approved for the treatment of postmenopausal osteoporosis. Raloxifene has estrogen agonist activity on the bones and lipids and an estrogen antagonist effect on the breast and uterus. Raloxifene is effective for reducing the incidence of vertebral fractures but effectiveness at the hip has not been shown. Although raloxifene increases the risk of venous thromboembolism, it is indicated to decrease the risk of invasive breast cancer in postmenopausal women with osteoporosis. Perhaps it may be best used in postmenopausal women with osteoporosis who are unable to tolerate bisphosphonates.

Tibolone: Tibolone has partial agonist activity at oestrogen, progestogen and androgen receptors. It prevents vertebral and non-vertebral fractures in post-menopausal osteoporosis. Treatment is associated with a slightly increased risk of stroke but a reduced risk of breast cancer.

Other drugs: Romosozumab is antibody directed against sclerostin, which is under development for the treatment of osteoporosis. It increases bone formation, inhibits bone resorption and increases BMD. When given subcutaneously in a dose of 210 mg monthly, it reduces the risk of vertebral fractures in patients with postmenopausal osteoporosis. Calcitriol is the active metabolite of vitamin D, is licensed for treatment of osteoporosis but it is seldom used because the data on fracture prevention are less robust than other agents.

Surgery

Orthopedic surgery with internal fixation: It is frequently required to reduce and stabilize osteoporotic fractures. Patients with intra-capsular fracture of the femoral neck generally need hemiarthroplasty or total hip replacement in view of the high risk of avascular necrosis.

Vertebroplasty: It is sometimes used in the treatment of painful vertebral compression fractures. It involves injecting methyl methacrylate (MMA) into the affected vertebral body under sedation and local anesthesia.

Kyphoplasty: It is used under similar circumstances but in this case a needle is introduced into the affected vertebral body and a balloon is inflated, which is then filled with MMA. It has similar efficacy to vertebroplasty but adverse effects are more common.

Complications

In addition to making the patients more susceptible to breaks and fractures, osteoporosis can lead to other complications:

Limited mobility: Osteoporosis can be disabling and limit the physical activity. A loss of activity can make weight gain and increase stress on the bones, in particular the knees and hips. Gaining weight can also increase the risk of other problems, such as heart disease and diabetes.

Pain: Fractures caused by osteoporosis can be severely painful and debilitating. Fractures of the spine can result in a loss of height, a stooping posture and persistent back and neck pain.

Hospital admission: Some people with osteoporosis break a bone and do not even notice it. Most broken bones need hospital care which leads to financial burden. All too often, hip fractures can lead to long term care in nursing homes. People who are bedridden are subject to cardiovascular complications, more exposed to infectious diseases and susceptible to various other complications.

Depression: Less physical activity can lead to a loss of independence and isolation. This loss, added to the fear of fractures, can bring on depression. A poor emotional state can further hinder the ability to manage health issues.

Prognosis

Osteoporotic fragility fractures can cause substantial pain and severe disability, often leading to a reduced quality of life, and hip and vertebral fractures are associated with decreased life expectancy. Hip fracture nearly always requires hospitalization, is fatal in 20% of cases and permanently disables 50% of those who are affected, only 30% of patients fully recover.

Conclusion

Osteoporosis is an important health problem affecting the elderly population. The yearly incidence of osteoporosis is increasing. This problem has great impact on society, leading to escalating healthcare cost. As the use of medications in the treatment of osteoporosis is expensive, healthy lifestyle and risk factors modification remain the most important primary prevention strategy in the community setting.

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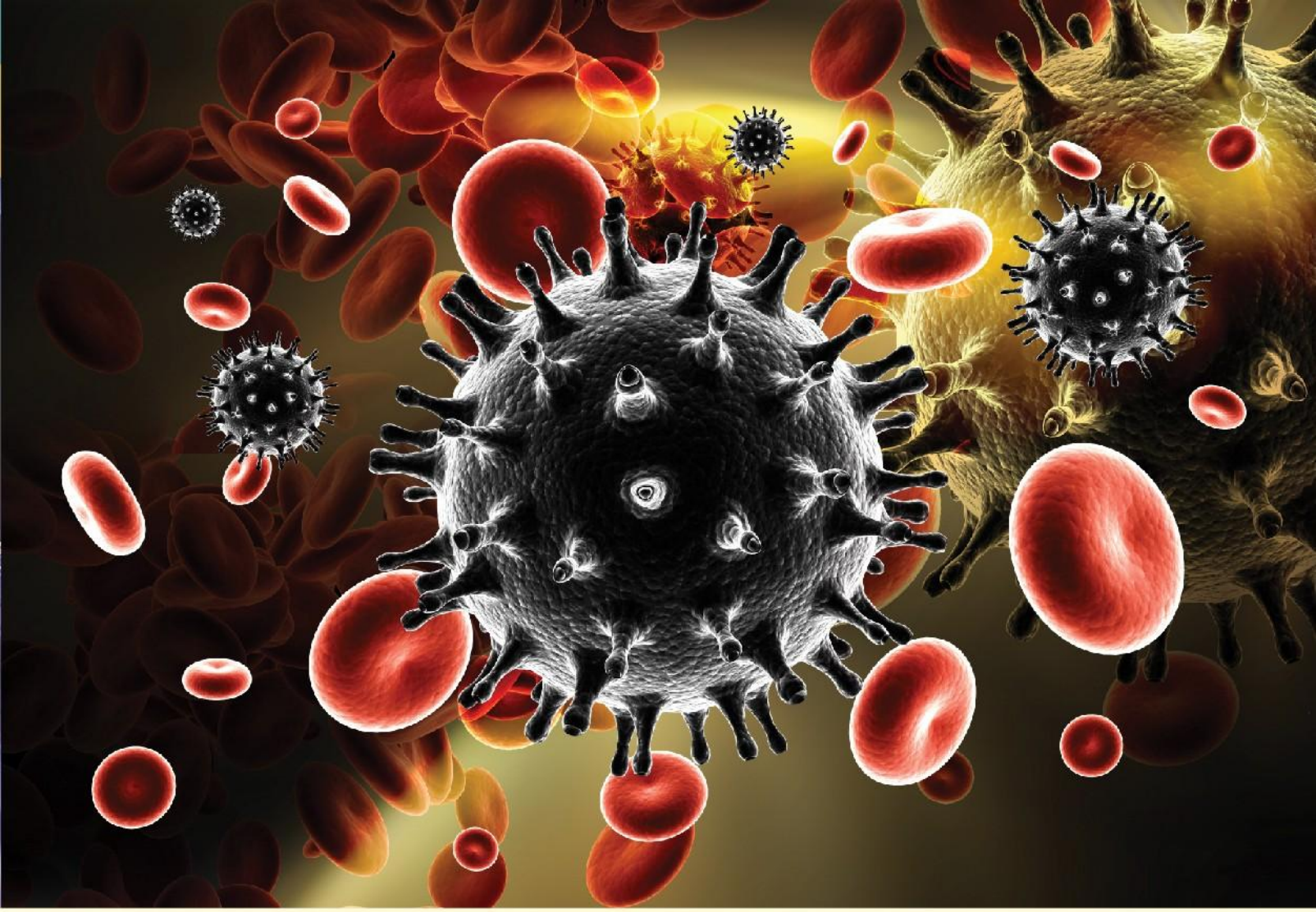
New organ discovered in human body

Dr. Neil Theise, a professor of pathology at New York University Langone School of Medicine and his research team discovered a new body part. They have found a network of fluid filled spaces in tissue that had not been seen before. According to this new study published in the journal Scientific Reports, the fluid filled spaces were discovered in connective tissues all over the body, including below the skin's surface, digestive tract lining, lungs and urinary systems and surrounding muscles. Researchers found that the tissue contains interconnected, fluid filled spaces that are supported by a lattice of thick collagen bundles. The researchers said these fluid filled spaces had been missed for decades because they do not show up on the standard microscopic slides. They are calling this network of fluid filled spaces an organ called the interstitium.

Dr. Neil Theise said that the findings may have implications for a variety of fields of medicine, including cancer research. For example, the findings appear to explain why cancer tumors that invade this layer of tissue can spread to the lymph nodes. According to the researchers, this occurs because these fluid filled spaces are a source of a fluid called lymph and drain into the lymphatic system. The new study expands the concept of the interstitium by showing the structured, fluid filled spaces within tissues and is the first to define the interstitium as an organ. This new work is based on the use of a relatively new technology called a "probe-based confocal laser endomicroscopy" or pCLE. This tool combines an endoscope with a laser and sensors that analyze reflected fluorescent patterns and gives researchers a microscopic view of living tissues.

Dr. David Carr-Locke and Dr. Petros Benias, both of whom were at Mount Sinai-Beth Israel Medical Center in New York City were using this technology when they saw something unusual while examining a patient's bile duct for cancer spread. They spotted a series of interconnected cavities in the tissue layer that didn't match any known anatomy. The imaging technique indeed showed the fluid filled spaces in the connective tissue. Later, the researchers also saw them in other samples of connective tissue taken from other parts of the body, in people without cancer. Dr. Michael Nathanson, chief of the digestive diseases section at Yale University School of Medicine said that the idea presented in the study appeared to be a new concept.

Reference: www.livescience.com



Mycoplasma genitalium can be next superbug

Dr. William Schaffner, an infectious disease specialist at Vanderbilt University Medical Center in Nashville, Tennessee said *Mycoplasma genitalium* is a well known infectious disease organism. He warns that a sexually transmitted infection (STIs) called *Mycoplasma genitalium* could become a "superbug" if it is not identified and treated properly in patients. *Mycoplasma genitalium* is also called MG or MGen. The bacterium that was first discovered in 1981, according to the British Association of Sexual Health and HIV (BASHH). It can cause STIs in both men and women, Schaffner said. In men, the bacteria can cause inflammation of the urethra called urethritis. In women, the bacteria have been linked to inflammation of the cervix called cervicitis, as well as symptoms such as post coital bleeding and painful urination. If left untreated, the bacteria may ascend through the cervix and lead to a condition called pelvic inflammatory disease (PID). PID affects the female reproductive organs and can lead to pain in the lower abdomen and in some cases infertility, according to the Centers for Disease Control and Prevention. Schaffner says, people who are infected with *Mycoplasma genitalium* often have no symptoms. According to BASHH, it is estimated that about 1% to 2% of people in the general population have *Mycoplasma genitalium* infection. According to CNN, people with *Mycoplasma genitalium* infection are often treated with antibiotics for chlamydia. But this treatment approach is a problem, because antibiotics for *Mycoplasma chlamydia* don't work well for *Mycoplasma genitalium* and their use can promote antibiotic resistance. That's why BASHH recently released guidelines that recommend testing for *Mycoplasma genitalium* in patients with certain symptoms, such as urethritis or signs of PID. Schaffner says that the big problem with identifying and properly treating *Mycoplasma genitalium* infections is the absence of simple, inexpensive diagnostic test available for the condition. Journal of Infectious Diseases concluded that the public health response to *Mycoplasma genitalium* is in its early stage. Schaffner noted that 30 years ago, there was no test for chlamydia. But once a test became available, the test was widely used and the infection is effectively treated. So, he hopes the same for *Mycoplasma genitalium*.

Reference: www.livescience.com

WORLD POLIO DAY

24th OCTOBER

HISTORY OF WORLD POLIO DAY

The 24th October of every year is World Polio Day. World Polio Day was established by Rotary International over a decade ago to commemorate the birth of Jonas Salk who led the first team to develop a vaccine against poliomyelitis. Use of this inactivated poliovirus vaccine and subsequent widespread use of the oral poliovirus, developed by Albert Sabin, led to the establishment of the Global Polio Eradication Initiative (GPEI) in 1988. As of 2013, GPEI had reduced polio worldwide by 99%. Polio vaccine, given multiple times, almost always protects a child for life. The strategy to eradicate polio is therefore based on preventing infection by immunizing every child until transmission stops and the world is polio free.

END POLIO NOW

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