Botswana's Premier Health Journal

DIAGNOSTICS

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World Health Day 2015
Focused on Food Safety

Suffering from High Blood Pressure

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COVER IMAGE:
Fresh Vegetables

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Dear Reader,

One of the great aspects of this job is having the opportunity to talk with and listen to the many different manufacturers, distributors, and of course the huge network of dealers that is the backbone of our industry.

Years ago I never would have ever imagined I would be in this position, and it is amazing. To say I really enjoy this job is an understatement.

What makes Diagnostics Update.com so unique is their informative and educative ways to the nation.

The staff and management is always looking for ways to inform their readers on how to tackle different medical issues. Basically, you want more people to enjoy reading more and more.

That said, there is still the need to get more readers to embrace healthy routines within and outside the homestead. This October/November/December issue we focus more on the winter/spring season ailments. We take a look at different ways to keep healthy.

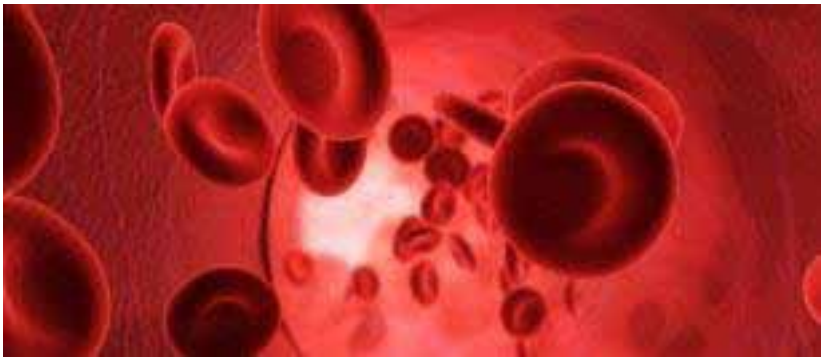
SUFFERING FROM HIGH BLOOD PRESSURE

High blood pressure is one of the major health problems of the 21st century. It is estimated that 43 million suffer with high blood pressure, and less than 10 million are successfully managing it. Many lifestyle factors—such as stress, obesity, excessive use of stimulants, smoking, or a high sodium intake—contribute to increased blood pressure.
The Centers for Disease Control estimate that more than 90 percent of middle aged people will develop high blood pressure at some point in their lifetime. Hypertension, a form of high blood pressure, is the most common risk factor for cardiovascular disease in the in the world affecting one in three adults.

What Level is Considered High Blood Pressure?

Blood pressure is often written as two numbers. The top (systolic) number represents the pressure when the heart is beating. The bottom (diastolic) number represents the pressure when the heart is resting between beats.
Blood pressure is measured by the blood that presses against the walls of the arteries and blood vessels. For people who suffer from high blood pressure, this measurement is abnormally high. When blood pressure is high, the heart must work harder to pump an adequate amount of blood to all parts of the body. Although blood pressure varies from person to person and also by age, in general terms, normal blood pressure should be less than 130 mm Hg systolic and less than 85 mm Hg diastolic. Optimal blood pressure is less than 120 mm Hg systolic and less than 80 mm Hg diastolic (120 over 80).

Why is Management Important?



When your blood pressure is unusually high your heart has to work harder in order to get blood to the parts of your body that need it. That puts an excess strain on your heart and arterial walls lose their elasticity.

What causes high blood pressure?

High blood pressure is caused by several different factors and varies from person to person. In many cases it is caused by undue emotional or physical stress. It can also be caused by plaque clogging up your arteries - usually because of high cholesterol levels. The dangerous cases occur when high blood pressure is caused by a hardening of the arteries, which makes it difficult for your blood vessels to dilate.

Top 10 Risk Factors of High Blood Pressure?

1. You are more than 4.5kg overweight.
2. You are over the age of 45
3. You have poor dietary habits
4. You eat salt and red meat
5. You have a high level of stress
6. You do not exercise enough
7. You smoke 8. You drink 2 or more alcoholic beverages a day 9
. You have poor sleeping habits
10. You have a family history of high blood pressure

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Is it really possible to suffer from high blood pressure and not know it?

Yes. That's why it's commonly called "The Silent Killer." The Centers for Disease Control report that as much as one-third of the people who suffer from high blood pressure don't know it.

What is the difference between high blood pressure and hypertension?

The two terms are often used interchangeably, but do have a slightly different meaning. High blood pressure refers to a single incidence - such as, if your blood pressure went up for a brief period of time after a minor car accident. Hypertension refers to your blood pressure remaining elevated for an extended period of time.

What are the most common symptoms of high blood pressure or hypertension?

While high blood pressure often manifests itself symptom-free there are some common indicators of hypertension including nosebleeds, racing or irregular heartbeat, headaches and dizziness.

ARE SYSTOLEX'S INGREDIENTS SAFE AND EFFECTIVE?

The all-natural ingredients in Systolex have been shown to be safe and effective through clinical studies and have been recommended by healthcare professionals.

INGREDIENTS

Magnesium:
Magnesium may reduce blood pressure in people with high blood pressure. Magnesium is the fourth most abundant mineral in your body and is responsible for the function of over 350 enzymes in your body, including the relaxation of blood vessels, dissolve blood clots, dramatically lessen the site of injury and arrhythmia, and act as an antioxidant against the free radicals forming at the site of injury. Doctors have been prescribing magnesium for heart disease since the 1930s.

Magnesium

Hawthorn Extract:
Hawthornhas been used to inhibit heart disease as far back as the 1st century. It can help improve the amount of blood pumped out of the heart during contractions, widen the blood vessels, and increase the transmission of nerve signals.

Hawthorn Extract

Coleus forskohlii extract:
Coleus forskohlii causes the lowering of blood pressure by increasing camp levels throughout the cardiovascular system, which results in relaxation of the arteries.

Coleus forskohlii extract

Taurine:
Taurine has been very successfully used to manage high blood pressure. When excessive fluid is normalized, blood pressure becomes normalized. Taurine functions to dampen the sympathetic nervous system, thereby relieving arterial spasm. When blood vessels relax, the body's blood pressure will fall.

Taurine

Hops Strobiles:
Hops stabiles have been used to calm the nerves and allow the body to relax and lower the body's blood pressure naturally.

Hops Strobiles

WORLD HEALTH DAY 2015
Focused on Food Safety

New threats to food safety are constantly emerging, according to the World Health Organization. The World Health Organization is marking World Health Day 2015 on April 7 and has focused it on food safety. Unsafe food is linked to the deaths of an estimated 2 million people annually, many of whom are children, according to the UN agency, which notes that food containing harmful bacteria, viruses, parasites, or chemical substances is responsible for more than 200 diseases, ranging from diarrhea to cancers.

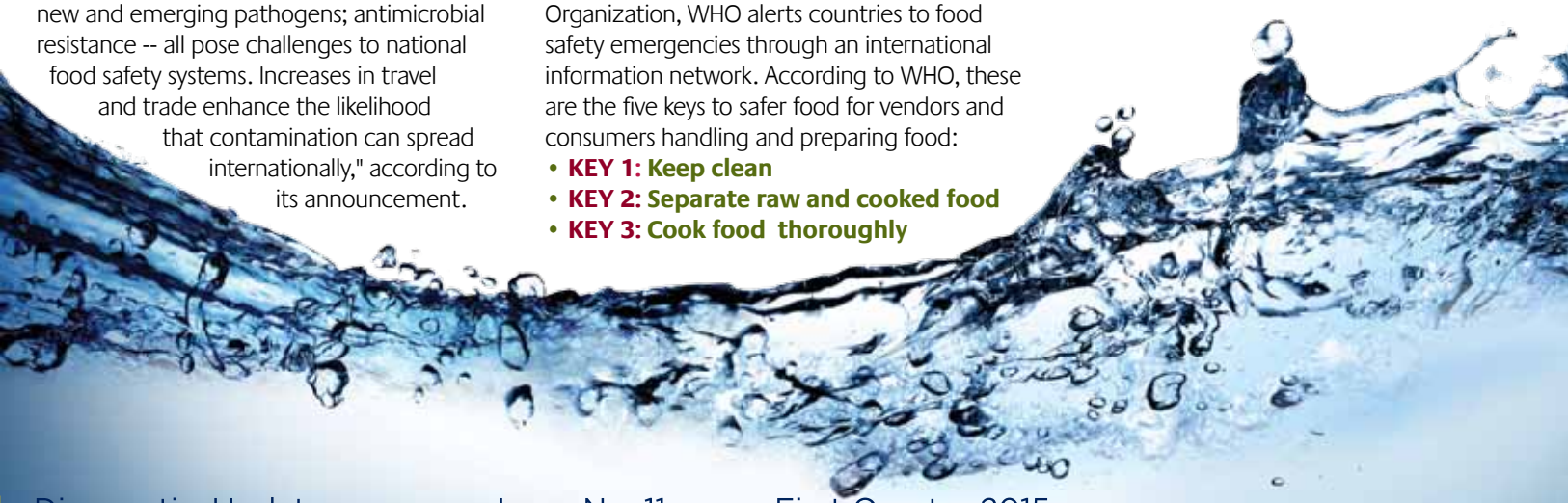
To make matters worse, WHO reports new threats to food safety are constantly emerging.

"Changes in food production, distribution and consumption; changes to the environment; new and emerging pathogens; antimicrobial resistance -- all pose challenges to national food safety systems. Increases in travel and trade enhance the likelihood that contamination can spread internationally," according to its announcement.

The world's food supply is becoming increasingly globalized, so there is a growing need to strengthen food safety systems in and between all countries.

Together with the UN Food and Agriculture Organization, WHO alerts countries to food safety emergencies through an international information network. According to WHO, these are the five keys to safer food for vendors and consumers handling and preparing food:

- **KEY 1: Keep clean**
- **KEY 2: Separate raw and cooked food**
- **KEY 3: Cook food thoroughly**
- **KEY 4: Keep food at safe temperatures**
- **KEY 5: Use safe water and raw materials**

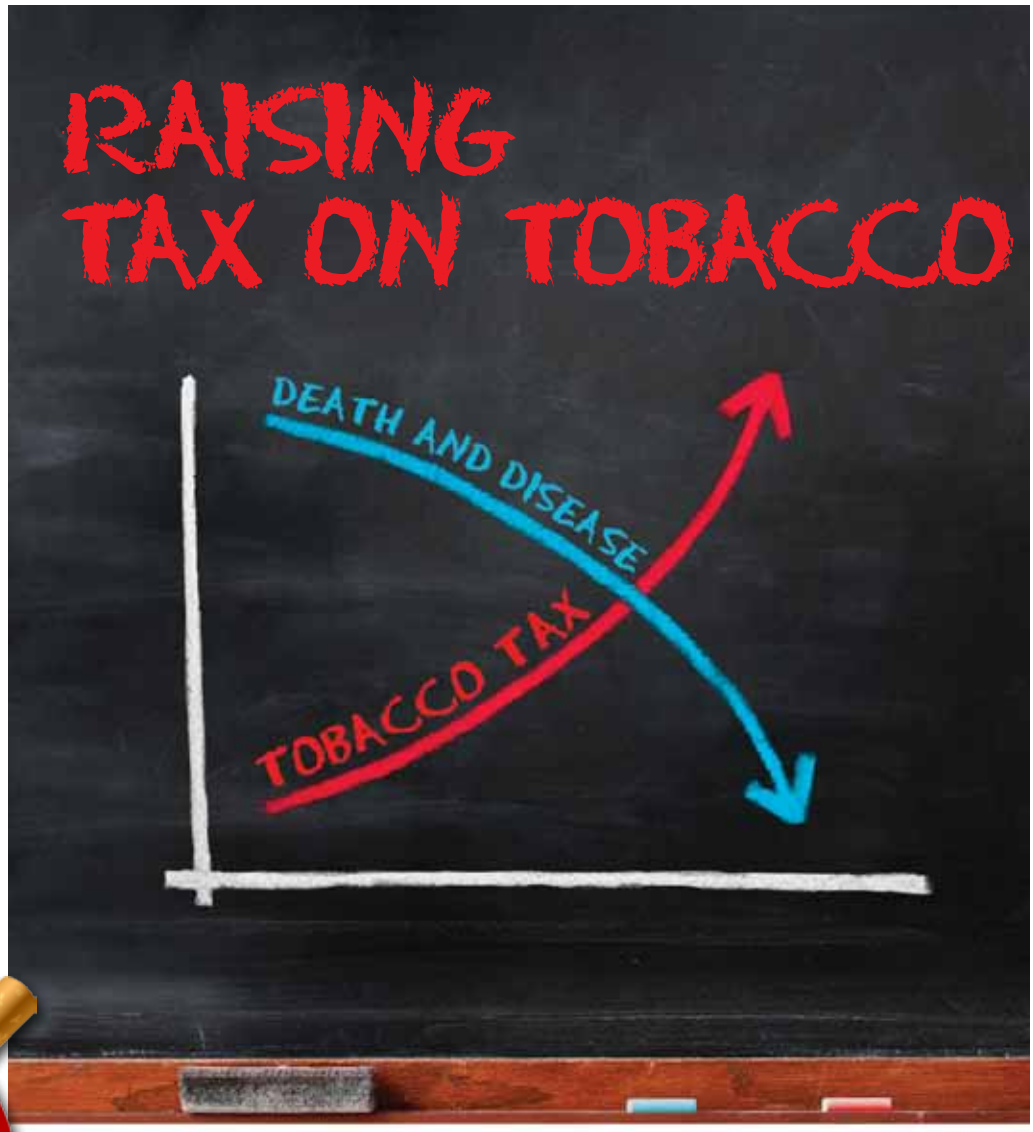


WORLD NO TOBACCO DAY 2015

Sun 31st May 2015 Worldwide

World No Tobacco Day is an initiative run by the World Health Organization (WHO). The aim of this event is to inform the public about the dangers of using tobacco and make them aware of the business practices of tobacco companies.

World No Tobacco Day also aims to educate people about the work WHO undertakes in fighting the global tobacco epidemic.
A large part of this work is educating the public about the manipulative tactics tobacco companies use to 'dupe' people into smoking their products.
Tobacco companies spend billions of dollars on advertising each year, portraying people who smoke as being cool, glamorous, macho and having other valued after traits.
In truth, cigarettes are highly engineered products designed to cause addiction and which often kill.
Cigarettes are highly addictive due to the presence of nicotine in the tobacco. However, over the years executives from the major tobacco companies have denied this.
Whilst there are more restrictions on how tobacco companies can advertise their products in developed countries such as the United States, in other parts of the world people are still subjected to the more aggressive & manipulative advertising tactics.
Whilst there are fewer restrictions in these countries, international sales will keep these tobacco companies going.



For information:
visit the
World No Tobacco Day website

WHAT YOU NEED TO KNOW

World Health Organization

INSIDE THE LAB

Except for the relationship you have with the person who takes your test sample, such as blood, it is rare that you get a glimpse of the many people involved in generating a laboratory test result. Nor do you get much opportunity to learn what happens after the specimen disappears from view.

As labs take on an increasingly prominent role in health care – in some states, patients are permitted to order lab tests without a doctor's prescription – understanding what happens behind the scenes is almost as important as knowing what can be learned from your test results. The articles listed below have been prepared to give you a better sense of the lab and how it functions.

Blood Banking

Blood banking, the process of collecting (donation), testing, processing, and storing blood for later use (transfusion), is a cornerstone of emergency and surgical medicine and is dependent on the clinical laboratory for ensuring the safe use of blood and its components. This article provides a glimpse into four key aspects of blood banking:

- Donating Blood,
- Protecting Supply,
- ensuring its proper use, and
- the Risks involved for donors as well as recipients.

Blood transfusions, the introduction of blood or blood components from one person into the bloodstream of another, are essential for saving the lives of victims of trauma, for those undergoing major surgery, and for those with other causes of blood loss. Blood transfusions also are used to treat severe anemia resulting from the effects of chemotherapy, cancer, sickle cell disease, and thalassemia.
Blood Centers give a great deal of attention to both the safety and the maintenance of the nation's blood supply. In particular, they monitor potential problems with the supply, such as reduced numbers of blood donors and the risk of transmittal of blood-borne infections.

Donating Blood

Who can donate blood?

Blood donors are volunteers who provide a greatly needed service. About 4 million patients receive blood transfusions each year, and approximately 40,000 units of red blood cells are needed every day. Although 14 million blood units are donated a year, more volunteers are needed to keep the blood supply at an adequate volume.
Donors must meet certain criteria to ensure their safety and the safety of the recipients

Donors must:

- be at least 17 years of age (although some states permit younger people to donate if they have parental consent)
- be in good health
- weigh at least 110 pounds (Some facilities will allow people who weigh less to donate, but they must then adjust the amount of blood collected and the amount of anticoagulant in the collection bags.)
- pass a physical and health history examination prior to donation.

The physical includes measurement of blood pressure, pulse, and temperature as well as a test for anemia, which requires just a few drops of blood from your finger.

To protect the health of both the donor and the recipient, the health history questionnaire asks about potential exposure to transfusion-transmissible diseases, such as viruses like HIV, hepatitis B and C, and HTLV I and II as well as parasites that cause malaria, babesiosis, and Chagas' disease.

Certain people are not permitted to donate blood for health concerns. This includes:

- Anyone who has ever used illegal intravenous (IV) drugs
- Men who have had sexual contact with other men
- Hemophiliacs
- Anyone with a positive test for HIV
- Men and women who have ever taken money, drugs, or other payment for sex
- Anyone who has had hepatitis since his or her eleventh birthday
- Anyone who has had babesiosis or Chagas' disease
- Anyone with Crueutzfeldt-Jakob disease (CJD) or who has an immediate family member with CJD
- Some travel or health problems may require a temporary deferral.

Donors have a personal responsibility to help ensure the safety of the blood supply. You should express any concerns or questions you may have about past illnesses you had or may have been exposed to before donating. Who knows? Maybe someone close to you will be the recipient of your blood donation.

Where can blood be donated?

Blood can be donated at community blood centers, hospital-based donor centers, or mobile sites temporarily set up in public areas like colleges, workplaces, and churches. There are hundreds of institutions involved in blood banking throughout each nation worldwide.

What is donated and how often?

Usually one unit (about a pint) of blood is collected into a blood bag from a vein in the inner part of the elbow joint using a new, sterile needle. Your body replenishes the fluid lost during donation in 24 hours, but it may take up to 2 months to replace the lost red blood cells. Therefore, whole blood can be donated only once every 8 weeks. Two units of red blood cells can be donated at a time, using a process called red cell apheresis, every 16 weeks. Platelets can also be donated by apheresis, usually every 4 weeks.

What are the components of blood?

Blood is made up of several components. These components can be separated in the laboratory so that they can be transfused into multiple patients, each with different needs, since rarely will a person need all of the components within whole blood. These components include:

- Red blood cells – main cellular element in the blood; carry oxygen to the body tissues; used in the treatment of anemia resulting from, for example, kidney failure, gastrointestinal bleeding, or blood loss during trauma or surgery
- Platelets – cellular elements needed for blood to clot; used in the treatment of leukemia and other types of cancer and conditions in which patients have a shortage of platelets (e.g., thrombocytopenia) or abnormal platelet function to control bleeding
- Plasma – straw-colored fluid part of blood in which the red and white blood cells and platelets are suspended; helps to maintain blood pressure and the fluid-electrolyte and acid-base balances of the body and transport wastes; used to help control bleeding when no coagulation factor-specific concentrate is available
- Cryoprecipitate antihemophilic factors (AHF) – part of the plasma that contains clotting factors to help control bleeding in people with hemophilia and von Willebrand's disease; only used when viral-inactivated concentrates containing Factor VIII and von Willebrand factor are unavailable or, at times, during surgery as a hemostatic preparation (fibrin sealant)
- White blood cells – cellular elements that fight infection and function in the immune

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BACTERIAL VAGINOSIS - TO TREAT OR

Dr Mohan Narasimhamurthy Dr Menaka Ambarishan, Ignetious Makozhombwe, Kenias Sibanda, Uma shekar

Bacterial vaginosis(BV) is the most common vaginal infection, caused by certain anerobic bacteria such as gardenella vaginalis, prevotella bacteriodes which replace the normal lactobacilli bacteria in the vagina. The mechanism of replacement of normal flora by the anaerobic bacteria is poorly understood. Evidence has accumulated that bacterial vaginosis is associated with serious medical complications like miscarriage, premature rupture of the fetal membranes, premature labour and postpartum complications in the infant. In addition, new evidence has shown that BV increases women's risk of acquiring sexually transmitted diseases (STDs) and HIV infection. The objectives of this manuscript are (1) to review the available evidence of the prevalences of BV in different populations around the world and in Botswana, (2) to highlight the existing knowledge gap in understanding the risk factors, diagnostic tests and treatment guidelines for bacterial vaginosis.

Epidemiology:

One of the most striking features is the extent to which BV prevalences vary by ethnic group. This has been most extensively documented and investigated in the USA. A series of surveys spanning 20 years one nationally representative, another all women entering the US marines and two large samples of the antenatal population all revealed similar findings. BV prevalence was highest in blacks, and lowest in whites and Asians, with Hispanics having an intermediate prevalence. These differences remained remarkably stable through the period investigated.

Geographical pattern reveals, highest in parts of Sub Saharan Africa nearing 50% and lowest in much of Asia and Europe. BV prevalence was low in North America excluding amongst African Americans in the USA and Aboriginals in Canada. In general BV prevalence, as assessed with the summary indicator, co-varies fairly closely with regional HIV prevalence. Some populations in Africa have very low BV prevalence (Burkina Faso, where well-conducted surveys have established that the prevalence of BV is low).

A search was conducted in the PubMed/Medline and Web of Science databases to retrieve the literature about the prevalence of BV in Botswana. **We found one article in the Bulletin of the worldHelath Organization |** April 2007, 85 (4) **titled Trichomoniasis and bacterial vaginosis in pregnancy:inadequately managed with the syndromic approach in Botswana.** M Romoren,a M Velauthapillai,b M Rahman,c J Sundby,d E Kloumane & P Hjortdahl:

Important observations from the above study:

- The prevalence of BV is 38.1% (268/703) among pregnant women
- Among the 268 women with BV, 205 (76%) were asymptomatic.
- The predominant symptom was non- candida like discharge
- The inaccuracy of vaginal discharge in predicting pathological conditions in pregnancy and the magnitude of asymptomatic BV is a challenge in developing countries, as is the quality of care provided.

Apart from the above study, there is no other systematic study or review of the incidence and prevalence of bacterial vaginosis in pregnant and non- pregnant women in Botswana. Hence, there is an urgent need to establish this data and treatment guidelines for bacterial vaginosis in symptomatic as well as asymptomatic patients.

Both its aetiology and the reason for the widely differing prevalences around the world remain unclear. BV has thus been referred to as "one of the most prevalent enigmas in the field of medicine". There has been considerable debate in the literature as to whether BV is a sexually enhanced disease or a sexually transmitted disease. The balance of evidence suggests that sexual transmission is at least an important aspect of its epidemiology.

Risk factors:

An increased number of sexual partners in the recent past have been shown to be a significant individual-level risk factor for BV in a number of studies.

Being African-American was found to be a residual risk for BV in the USA. The strength and persistence of this association in studies from the USA has led a number of researchers to conclude that "differences in the structure and composition of microbial communities may underlie well-known differences in the susceptibility of (black) women to BV. African race per se is, however, unlikely to be a necessary or sufficient aetiological agent for BV as there are a number of populations in sub-Saharan Africa, such as Burkina Faso, where well-conducted surveys have established that the prevalence of BV is low.

Low socioeconomic status is concerned, many of the communities with elevated BV rates may have high rates of poverty, but not all have, and the part of the world which contains the majority of the world's population living on under $1,25 per day (South Asia) has a relatively low BV prevalence. Other reported risks factors include the intrauterine device, douching, smoking, menses, lack of male circumcision, low vitamin D levels, other dietary factors, chronic stress and genetic variants of a wide range of host genes. Therefore, it is important to try to establish a correlation between BV and factors affecting its prevalence in Botswana.

Diagnosis:

Amsel Creteria - It includes 4 signs (homogenous white discharge, amine odour, pH >4.5, and clue cells). 3 of which are needed for the diagnosis of Bacteria Vaginosis.

Nugent's scoring system (NSS) bases the diagnosis of BV on the interpretation of a Gram stain of vaginal secretions. Score ranges from 1 to 10 on the basis of bacterial types and quantities: a score of 10 reflects the most extreme overgrowth of BV-associated organisms. The diagnosis of BV is defined as a Nugent score of greater than or equal to 7 out of 10. The Gram's stain scoring method includes a score for the quantity of vaginal lactobacilli on the slide.

The degree of inter and intra-observer variability of NSS is low compared to Amsel's criteria and it

ON PAP SMEAR NOT TO TREAT?

has been established as a reproducible and reliable test. Much of the formal researches on BV associated adverse outcomes and treatment trials for BV have used the Gram's stain for diagnosis because of improved quality assurance and reproducibility of results.

Pap smear- According to Bethesda system, criteria for diagnosis of bacterial vaginosis is presence of clue cells (Fig 1) in the filmy background.

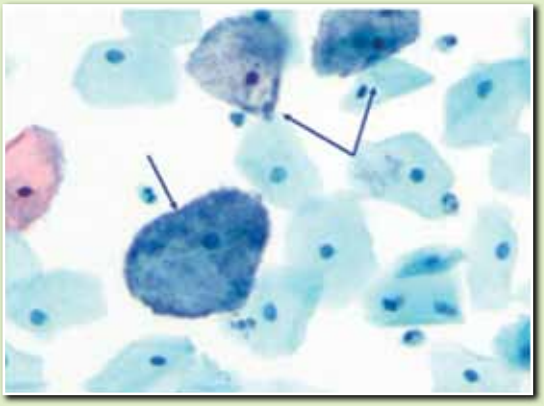

Fig 1: Indicator cells also known as "Clue Cells" form the characteristic picture of BV.
Note the presence of multiple microorganisms, which are attached to a single squamous epithelial cell.

Compared to gram staining, Pap smear with a sensitivity of 61% cannot be regarded as sensitive enough to be used as a screening test for bacterial vaginosis. However, according to many studies, Pap smear is highly specific (nearly 97.5%) in detecting bacterial vaginosis. Hence, a positive diagnosis is of definite diagnostic value.

Therapy Options for BV:

Pregnant symptomatic Women

Revised guidelines in Botswana (Botswana Ministry of Health. Management of Sexually Transmitted Infections. Reference Manual for Health Workers.

Gaborone: MoH; 2005). recommend metronidazole 250 mg three times daily for 7 days to cover BV. (Please verify with the latest guidelines if any) Treatment of asymptomatic bacterial vaginosis in low-risk pregnant women remains controversial. It should be tailored to each patient depending on the clinical setting.

Nonpregnant symptomatic Women

The established benefits of therapy for BV in non- pregnant women are to
(1)Relieve vaginal symptoms and signs of infection and (2) reduce the risk of infectious complications after induced abortion or hysterectomy. Other potential benefits would be the reduction of other infections, such as acquisition of STD or HIV.

Currently, recommended therapy is oral metronidazole 500 mg twice daily for 7 days, metronidazole gel 0.75% [5 g] intravaginal twice daily for 5 days, or clindamycin cream 2% [5 g] once daily for 7 days.

Nonpregnant asymptomatic Women: Bacterial vaginosis is mostly present without signs and symptoms. It is hard to make an asymptomatic patient feel better; we should demand evidence before assuming that the benefits of diagnosis and therapy outweigh their burdens. However, there are instances in which treatment is justified, such as prior to transvaginal procedures (e.g., intrauterine device insertion, endometrial biopsy).

Relapse rate following treatment is extremely high and sometimes it is frustrating to treat bacterial vaginosis. Current recommended treatment is not preventing the recurrence of BV or abnormal vaginal flora in the majority of women; factors associated with recurrence support a possible role for sexual transmission in the pathogenesis of recurrent BV.

Conclusion:

In our practice in the last three years, we have observed that the nearly 50% of pap smears (i.e 16000/ 32,000, unpublished data, which is comparable with other studies in sub-saharan africa) show clue cells, suggesting the possibility of bacterial vaginosis. Treating all patients with the diagnosis of possible bacterial vaginosis on Pap smear is unwarranted. The present guideline for treatment of bacterial vaginosis is only meant for symptomatic pregnant and non-pregnant patients. In addition, asymptomatic high risk pregnant women need treatment. Asymptomatic non pregnant women should be clinically observed as the natural history of bacterial vaginosis is such that it may resolve (and recur) spontaneously. There is no evidence-based recommendation for the treatment of asymptomatic women with bacterial vaginosis;

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Trichomoniasis and bacterial vaginosis in pregnancy:inadequately managed with the syndromic approach in Botswana. M Romoren,a M Velauthapillai,b M Rahman,c J Sundby,d E Kloumane & P Hjortdahl: Bulletin of the worldHelath Organization | April 2007, 85 (4)

Bacterial vaginosis: comparison of Pap smear and microbiological test results
C¸ig˘dem Tokyol1, Orhan Cem Aktepe2, Arif Serhan Cevriog˘lu3, Mustafa Altındis¸2 and Fatma Hu¨ sniye Dilek1 Modern Pathology (2004) 17, 857–860

Bacterial Vaginosis and Correlates in Women of Reproductive Age in Thika, Kenya. J. Nzomo, P. Waiyaki, R. Waihenya Advances in Microbiology, 2013

Asymptomatic bacterial vaginosis: response to therapy.
Schwebke JR1. Am J Obstet Gynecol. 2000 Dec; 183(6):1434-9.

High recurrence rates of bacterial vaginosis over the course of 12 months after oral metronidazole therapy and factors associated with recurrence.

Bradshaw CS1, Morton AN, Hocking J, Garland SM, Morris MB, Moss LM, Horvath LB, Kuzevska I, Fairley CK. J Infect Dis. 2006 Jun 1;193(11):1478-86. Epub 2006 Apr 26

FROM PAGE 07

process, including allergic reactions; one type, called granulocytes, can be transfused to fight infections that are unresponsive to antibiotic therapy, although the effectiveness of this form of treatment is still being investigated

Separation of these components is performed by first treating the blood to prevent clotting and then letting the blood stand. Red blood cells settle to the bottom, while plasma migrates to the top. Using a centrifuge to spin out these components can speed up the process. The plasma is then removed and placed in a sterile bag. It can be used to prepare platelets, plasma, and cryoprecipitate antihemophilic factors, again with the help of a centrifuge to separate out the platelets. Plasma may be pooled with that from other donors and processed further (fractionated) to provide purified plasma proteins, such as albumin, immunoglobulin, and clotting factor concentrates.

What is autologous blood donation?

Another type of blood donation is autologous donation. This refers to transfusions in which the blood donor and the transfusion recipient are the same. People may elect to do this before a surgical procedure in which the likelihood of needing a transfusion is high. Although there are still risks with this process, autologous donation minimizes many of them because it is the person's own blood that is being returned to his or her body.

A person can donate their blood up until 72 hours prior to their surgery. Iron supplements or erythropoietin also may be prescribed to help increase the person's red blood cell count. Any blood that remains unused during the surgery is usually discarded. However, the blood can be transfused into another patient if it has been fully tested and is compatible with the recipient.

Protecting the Blood Supply

Testing Donated Blood

In the blood bank laboratory, certain tests must be performed on all donated blood. This includes typing to determine the donor's ABO blood group and Rh status as well as several screens to ensure the safety of the blood. Screening is conducted for: 1) unexpected red blood cell antibodies that could cause reactions in the recipient (such as those made as a result of a previous transfusion or pregnancy); 2) bacterial contamination in units of platelets; and 3) current and past transmissible infections; each unit of donated blood is tested for:

- Hepatitis B
- Hepatitis C
- HIV types 1 and 2
- Human T-Lymphotropic Virus (HTLV) types I and II (a serious but relatively rare illness)
- Syphilis
- West Nile Virus

A new test has been approved by the FDA to detect blood infected with Chagas' disease. The test is not yet mandatory, but many facilities have already begun screening all blood donors for this disease.

Testing for these infectious diseases often is done by antibody screening, such as the HIV antibody test, which looks for the antibodies the body makes in response to the invading virus. However, new tests are available that detect the genetic material of the viruses themselves, which shortens the window of time in which the virus may be undetectable in a donor. Known as nucleic acid amplification testing (NAT), this methodology is being used routinely to screen donated blood for hepatitis and HIV and has helped improve the safety of the blood supply in this country.

Confirmatory tests are performed in duplicate if any test results are positive in order to rule out false positives. If both confirmatory test results are negative, the initial screening result may be considered a false positive. Depending on the facility and the guidelines used, the unit may then be released for use. Some facilities discard the unit regardless of the confirmatory test result.

Once the testing is completed, those units of blood that are free of infection are made available for transfusion when needed. Those in which infection is detected are discarded, and the donor is notified as well as prohibited from future blood donation.

It also is important to realize that there are some infectious diseases that are not or cannot be tested for at the present time, such as malaria. The potential for an infectious agent that will not be detected by testing to be present in a donated unit underscores the importance of donors reporting any transmissible infections they have had or may have been exposed to in the past.

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Storing Blood Safely

Proper storage of whole blood and blood components is essential.

- Red blood cells must be stored under refrigeration and can be kept for a maximum of 42 days or frozen for up to 10 years.
- Platelets can be stored at room temperature for a maximum of 5 days.
- Fresh frozen plasma can be kept frozen for up to 1 year.
- Cryoprecipitate AHF made from fresh frozen plasma can be stored frozen for up to 1 year.
- Granulocytes (white blood cells) must be transfused within 24 hours of donation.

ABO and Rh blood typing are conducted on all donor units by the collection facility and in the laboratory for hospital patients. There are two steps to ABO typing: forward and reverse typing. First, forward typing is performed by mixing a sample of blood with anti-A serum (serum that contains antibodies against type A blood) and with anti-B serum (serum that contains antibodies against type B blood). Whether the blood cells stick together (agglutinate) in the presence of either of these sera determines the blood type. Second, in reverse typing, the patient's serum is mixed with blood that is known to be either type A or B to watch for agglutination. A person's blood type is confirmed by the agreement of these two tests.

Similarly, with Rh typing a sample of a person's red blood cells is mixed with an anti-serum containing anti-Rh antibodies. If agglutination occurs, then the blood is Rh-positive; if no reaction is observed, then the blood is Rh-negative. Rh testing is especially important during pregnancy because a mother and her fetus could be incompatible. If the mother is Rh-negative but the father is Rh-positive, the fetus may be positive for the Rh antigens. As a result, the mother's body could develop antibodies against Rh, which can destroy the baby's red blood cells. To prevent development of Rh antibodies, an Rh-negative mother with an Rh-positive partner is treated with an injection of Rh immunoglobulin during the pregnancy and again after delivery if the baby is Rh-positive.

Compatibility Testing

Compatibility testing is performed to determine if a particular unit of blood can be transfused safely into a certain patient. This includes ABO-Rh blood typing (see above), antibody screening (for unexpected red blood cell antibodies that could cause problem in the recipient), and cross-matching.

There are many antigens besides A, B, and Rh. However, neither the donor nor the recipient is tested routinely for these other antigens. However, if a patient has had a previous transfusion or been pregnant, they may have developed antibodies to one of these other antigens. Therefore, it will be important in all future transfusions that the donor's red blood cells do not have that particular antigen; otherwise, the recipient may have a transfusion reaction. The presence of such an antibody is determined by doing an antibody screening test by mixing the patient's serum with red cells of a known antigenic makeup.

Cross-matching is performed to determine if the patient has antibodies that react with the donor's cells. If there is a reaction, the laboratory staff will investigate further to identify the specific antibody and locate donor units that lack the antigen that matches the patient's antibody. This unit will then be tested to confirm that this is a safe match.

It is ideal to receive a blood transfusion with blood that matches your blood type exactly. However, anyone can receive type O red blood cells in an emergency. Therefore, people with type O blood (particularly O Rh-negative) are called "universal donors." People with type AB Rh-positive blood can be transfused with red blood cells from individuals of any ABO type and are commonly referred to as "universal recipients."

ENSURING PROPER USE BLOOD TYPING

Blood typing involves testing a person's blood for the presence or absence of certain antigens that are present on the red blood cells. Two of these antigens, or surface identifiers, are the A and B markers included in ABO typing. People whose red blood cells have A antigens are considered to be blood type A; those with B antigens are type B; those with both A and B antigens are type AB; and those who do not have either of these makers are considered to have blood type O. Our bodies produce antibodies against those ABO antigens we do not have on our red blood cells, which is why we can receive blood only from donors with certain blood types.

Another important surface antigen is called Rh factor. If it is present on your red blood cells, your blood is Rh+ (positive); if it is absent, your blood is Rh- (negative).

Distribution of blood types is as follows:

- O Rh-positive
- A Rh-positive
- B Rh-positive
- O Rh-negative
- A Rh-negative
- AB Rh-positive
- B Rh-negative
- AB Rh-negative

Risks

Are there risks associated with donating or receiving blood? It is safe to donate blood. A new, sterile needle is used for each donation procedure. Therefore, you cannot get infected with viruses, such as HIV or hepatitis, by donating blood.

In addition, donors are screened before giving blood to ensure that they are in good health and have no complications that could cause them harm by donating. Mild side-effects from the procedure that a donor might experience include stinging during insertion of the needle, upset stomach, dizziness, and possibly a small amount of bruising later at the site of the blood draw. In very rare cases, a donor may faint, have muscle spasms, or suffer nerve damage.

There are some risks with receiving blood transfusions. Some people fear that they may contract an infectious disease. However, donated blood is carefully screened for transmittable diseases, as noted earlier in this article. The risk of infection from transfusion is now extremely low (about 1 in 600,000 units transfused for hepatitis B and about 1 in 2 million units transfused for HIV and hepatitis C). Of greater concern is ABO incompatibility and transfusion reactions.

ABO incompatibility occurs when a unit of blood is transfused and the recipient has antibodies to the ABO antigens on the donor unit red cells (for example, a group O recipient receives a group A unit of red cells). The recipient of the blood transfusion could have an immune reaction against the foreign blood cells that can be very dangerous, even life-threatening. Besides just ABO incompatibility, there are other incompatibilities that can cause transfusion reactions. Antigens occur on other blood components, including white blood cells, platelets, and plasma proteins. The immune system will attack and destroy the donated blood cells, with serious side-effects for the patient.

There are several types of transfusions reactions, such as allergic and febrile (characterized by fever). Treatment will depend on the type of reaction and the patient's symptoms (for example, antihistamines may be used to reduce rash and itching from allergic reactions while acetaminophen may be prescribed to reduce fever). Many transfusion reactions go undetected and, therefore, unreported. However, the reported rate of transfusion reactions is on the order of 1 per 1,000 components or 1 in 400 people. Nearly all of these are non-infectious complications and include mis-transfusion, volume overload, febrile or allergic reactions, and transfusion-related acute lung injury (TRALI), a serious but infrequent reaction where the patient can develop breathing problems and may have a high fever.

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D-DIMER TEST IN VENOUS THROMBO EMBOLISM (VTE):

A COMMON HIV COMPLICATION

Infection with the human immunodeficiency virus (HIV) is a global pandemic with approximately 37 million adults infected worldwide. People living with HIV / AIDS are at an increased risk of venous thrombo-embolism (VTE) consisting of deep vein thrombosis (DVT) i.e. blood clots in veins of the lower and upper limbs and migration of dislodged clot to the lungs (embolism). DVT also carries the risk of the dreaded post thrombotic leg syndrome (PTS) secondary to damage to the veins with chronic leg swelling, pain and ulceration. VTE adds significantly to the morbidity of HIV infection but can also be fatal resulting in sudden death.

General causes of VTE include trauma and surgery with HIV specific factors involving deficiencies of natural anticoagulants such as protein S and presence of procoagulants including microparticles. The symptoms of DVT i.e. leg pain and swelling are non-specific requiring proper diagnostic tests to confirm the presence of a clot in one of the veins. The diagnosis of VTE starts with clinical assessment aided by scoring systems such as the Wells score. Confirmation of the clinical suspicion is however required with D-Dimer testing followed by radiological visualisation of the clot with techniques such as ultrasonography and computed tomography (CAT) scan.

Various studies have elucidated the association between HIV infection and VTE. The authors of a South African study titled Human immunodeficiency virus infection and acute deep vein thromboses1 examined the factors contributing to the HIV prothrombotic state and resultant increased prevalence of VTE. HIV infected individuals on anti-retroviral therapy (ART) show improvement in the degree of hypercoagulability but complete resolution does not seem to occur. The persistent abnormal haemostatic system on ART results in thrombotic tendencies even in treated patients.

The D-Dimer test is a screening blood assay with a negative result ruling out VTE as the cause of symptoms. A positive D-Dimer result is non-specific i.e. it can be raised in conditions other than VTE necessitating confirmatory tests. The D-Dimer test is therefore a simple, widely available blood test with an important role in the detection of VTE.

D-Dimer levels in HIV infected people can however be chronically raised due to opportunistic infections such as tuberculosis and in malignancies. These secondary diseases however independently further increase the risk of VTE. The pro-inflammatory HIV environment with elevated CPR and IL-6 are independently and positively associated with elevated D-Dimers.

HIV infection is therefore associated with a significant increased risk of VTE with the D-Dimer assay offering an easy screening test to detect this serious disease process. Although the D-Dimer test is not specific to the presence of VTE, it is a sensitive screening assay with a high negative predictive value. If the D-Dimer result is negative, VTE is unlikely. Elevated D-Dimer levels on the other hand are important in detecting VTE. More widespread use of the D-Dimer assay can make a significant impact on early VTE detection.

1Louw S, Jacobson BF, Büller H. Human immunodeficiency virus infection and acute deep vein thromboses. Clin Appl Thromb Hemost. 2008 Jul; 14(3):352-5. Epub 2007 Sep 25.

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