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# Medical Bulletin

## News You Can Use

## Osteoarthritis: New Blood Test Detects Early Stages, study finds

*Arthritis Research & Therapy, 2016.*

**There is currently no blood test for detecting early-stage osteoarthritis, a degenerative joint disease where the cartilage that eases and cushions movement breaks down, causing pain, swelling, and problems moving the joint.**

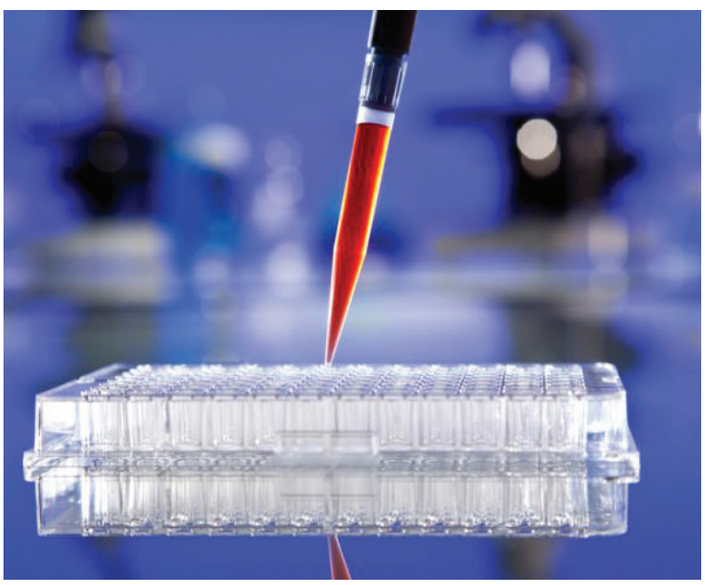
Now, researchers at Warwick University in the United Kingdom have **developed a blood test that can provide an early diagnosis of osteoarthritis and distinguish it from rheumatoid arthritis and other inflammatory joint diseases.This test looks for chemical signatures in fragments of joint proteins (amino acids) that have been damaged.**

**The earlier that arthritis is diagnosed - before physical and irreversible symptoms set in - the better the chances that treatment can focus on how to prevent the problem, for instance with lifestyle changes.**

**Scientists have known for a while that proteins in the arthritic joint get damaged, but this is the first time they have looked at them from the point of view of early disease diagnosis.**

**For the first time, small fragments from damaged proteins that leak from the joint into blood were measured.**

For the study, the team recruited 225 participants. These included patients with knee joint early-stage and advanced osteoarthritis and rheumatoid arthritis or other inflammatory joint disease, and healthy volunteers with no joint problems. Using mass spectrometry, the researchers analyzed samples of blood and synovial fluid (from the affected knee joints) for oxidized, nitrated, and sugar-modified proteins and amino acids. They found some patterns of damaged amino acids in samples from patients with early and advanced osteoarthritis and rheumatoid arthritis that were markedly lower in samples from the healthy volunteers.



Using sophisticated bioinformatic computer methods, **they developed algorithms - based on 10 damaged amino acids - that can diagnose early-stage osteoarthritis, rheumatoid arthritis, and non-rheumatoid arthritis.**

**In the case of early-stage osteoarthritis, the study found the blood test had a sensitivity of 92 percent and a specificity of 90 percent. These compare favorably with current techniques.**

For instance, current magnetic resonance imaging (MRI) techniques for evaluating cartilage damage in early-stage osteoarthritis have sensitivities around 70 percent and specificities around 90 percent. Also, compared with a blood test, such techniques are expensive and time-consuming, and cannot be used with some patients (e.g., those fitted with pacemakers.)

**This blood test could be available within 2 years, say the researchers.**

## Greetings from Blue Cross Laboratories!

*Dear Colleagues,*

*It gives me immense pleasure and satisfaction to present you with the first issue of the Blue Cross Medical Bulletin for the New Year. We wish you and your families a very happy, prosperous, and safe New Year!*

*This issue will have you updated on a few recent medical developments, and clinical insights involving novel discoveries/avenues in diverse therapeutic categories. We have also included a brief tutorial.*

*I am sure you would enjoy reading this edition of the Medical Bulletin as you did in the past. Please do remember to send in your feedback, so that we can incorporate the same in future editions.*

*Happy reading!*
*Best wishes & Warm regards,*

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SHORT TUTORIAL

# Thrombocytopenia in Acute Febrile Illness

**Acute febrile illness refers to fever of ≤2 weeks duration. It is also referred to as acute undifferentiated fever because of its short duration and absence of clinical features pointing to organ specific illness.** There is no international consensus definition, however, **fevers with localizing symptoms and signs are excluded from this definition,** e.g., acute pneumonia, acute meningitis, acute urinary tract infection, etc.

**There is a steep increase in the number of patients with acute febrile illness during monsoon period (June to September) in all parts of India, most frequently due to malaria, dengue, chickungunya, scrub typhus, leptospirosis, infectious mononucleosis, and typhoid fever.** For the majority of these patients, the illness is mild and resolves with disease-specific and supportive treatments, but **in some cases, the febrile illness progresses to acute renal failure, acute respiratory distress syndrome (ARDS), hepatic impairment, shock, central nervous system involvement and hemostatic abnormalities.**

**A challenging clinical situation which may been countered during the course of acute febrile illness is thrombocytopenia.** Thrombocytopenia is one of the most common hematologic disorders, characterized by an abnormally low number of platelets from multiple causes. **The normal platelet count is between 150,000 and 450,000 per microliter. Thrombocytopenia may be asymptomatic or manifest clinically as life-threatening bleeding.**

**Platelet transfusions may be given for thrombocytopenia to manage the active bleeding or as prophylaxis for those at serious risk of bleeding.** Appropriate platelet transfusion for thrombocytopenia in acute febrile illness has to be **individualized after considering the natural course of the causal disease (e.g., malaria, dengue, leptospirosis, scrub typhus, etc.), duration of fever, presence or absence of bleeding manifestations (purpura, bleeding gums, epistaxis, melena, etc.), and accompanying laboratory abnormalities.**

**Till date, no validated scoring system for platelet transfusion in febrile thrombocytopenia has been published.** As per the WHO guidelines, for an adult (approximate weight=70 kg), 4-6 single donor units containing at least 240 x $10^9$ platelets should raise the platelet count by 20-40 x $10^9$/L. Increment will be less if there is splenomegaly, disseminated intravascular coagulation (DIC) or septicemia.Transfused platelets have a short life span and will need to be re-dosed within 3-4 days if given for prophylaxis. **Since the past decade, platelet counts have been assessed on automated cell counters at many places. It has served the purpose of quick and reliable results of full blood count, detecting low platelet counts in early stage of acute febrile illness and monitoring it on a day to day basis, however this method has been associated with the problem of pseudothrombocytopenia.** In order to avoid inappropriate platelet transfusion, exclusion of pseudothrombocytopenia must be done before transfusing platelets in those patients of acute febrile illness without bleeding manifestations.


**Platelet transfusions may be given for thrombocytopenia to manage the active bleeding or as prophylaxis for those at serious risk of bleeding.**

**Thrombocytopenia is reported frequently in uncomplicated as well as severe malaria. Patients without bleeding manifestations and having normal test reports do not require platelet transfusion even if the platelet count is as low as 10,000-20,000/cmm.** It may take several weeks before platelet count becomes normal. **Administration oral folic acid helps facilitate recovery of platelet count.** In the event of associated coagulation factor deficiency due to liver injury, the patient may require early platelet transfusion and fresh frozen plasma.

**Dengue fever (caused by an arthropod-borne virus [flavivirus]) is usually a benign infection, but some patients develop life threatening dengue with high mortality and morbidity in the form of dengue hemorrhagic fever (DHF) and dengue shock syndrome (DSS).** Severity of bleeding is related to severity of thrombocytopenia. **Patients with duration of illness of 5-7 days and platelet count <20,000/cmm with bleeding manifestations (purpura, bleeding gums, epistaxis, melena, etc.) require platelet transfusion.** Those patients with simultaneously prolonged prothrombin time and/ or activated partial thromboplastin time may require additional blood components.

With the potential for transfusion-related complications (e.g., bacterial infections, transfusion-associated lung injury [TRALI], etc.), which may stem from inappropriate transfusions in patients with acute febrile illness, **the physician has to assess the risk-benefit ratio for non-transfusion versus transfusion. This decision may not be always easy, and in such situations, consultation with a hematologist or transfusion medicine specialist will help to obviate many inappropriate platelet transfusions.**

# Six Simple Ways to Lower Blood Pressure

1. **Eat healthily - the DASH Diet:** **The DASH diet stands for "Dietary Approaches to Stop Hypertension." It involves eating a diet that is rich in fruits, vegetables and low-fat dairy products.** The diet is also low in fat, and saturated fat in particular.

**The overall energy intake of the DASH diet is around 2,000 calories a day, and should be made up from:**

- **Grains:** 6 to 8 servings a day (e.g., bread, cereal, rice and pasta).
- **Vegetables:** 4 to 5 servings a day (e.g., 1 cup of salad leaves or 1/2 cup chopped vegetables such as carrots).
- **Fruits:** 4 to 5 servings a day - including juice, with 1 serving made up by 4 ounces of juice.
- **Dairy:** 2 to 3 servings a day - 1 serving is a cup of skim milk or low fat yogurt.
- **Nuts, seeds, and legumes:** 4 to 5 servings a week.
- **Low daily amounts of lean meat and poultry:** Oily fish such as salmon and tuna are a healthy meat option.

**The DASH goal is to keep the total daily calorie level below 30 percent coming from fats. Monounsaturated fats are healthier and include plant oils such as olive oil. Saturated fat and *trans* fat levels need to stay low.** *Trans* fat can be cut by eating less processed and fried food.

2. **Cut down on sodium:** Clinical trial evidence regarding cutting down on salt intake is "strong and consistent," according to the American College of

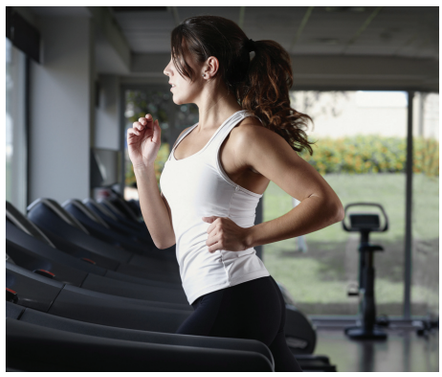

Cardiology and the American Heart Association.This is true whether:

- A person has high blood pressure
- Is a man or woman
- Regardless of age and race

The current dietary guidelines are that 2,300 milligrams of sodium is the maximum limit each day. People should also avoid adding salt when cooking or eating. People should reduce the amount of processed and restaurant foods they eat, which have high salt contents.

Eating less of the following high-sodium foods will help with efforts to reduce salt intake: Bread, cold cuts and cured meats, pizza, poultry, soups, sandwiches, cheese, pasta.

3. **Exercise, lose weight:** In the United States, the recommendation for exercise against blood pressure is:
   - Adults can do an **exercise activity of 40 minutes, 3 or 4 times a week** to lower their blood pressure.



   - Sessions should involve **physical activity that ranges in intensity from moderate to vigorous.**

**These exercise patterns will help tackle obesity, which raises blood pressure by putting more demand on the heart.**

4. **Stop smoking, drink moderately:** **Stopping smoking, or not taking it up in the first place,** is an important step against a wide array of health risks. Similarly, **keeping alcohol intake to sensible levels** helps against high blood pressure and has other benefits, too.

People should also keep caffeine intake to moderate levels. Coffee or energy drinks, for example, should not be the only source of fluids.

5. **Sleep well: A number of scientific studies have found that poor sleep is linked to higher blood pressure.** Sleeping well may be one way to help reduce blood pressure. Good sleep patterns and duration have other proven benefits, too.

**One group of scientists recently reviewed all the evidence for the link between sleep and high blood**

**pressure.** Published in the *Journal of Clinical Sleep Medicine* in 2015, the study concludes that **getting 7**

*(Contd. overleaf)*

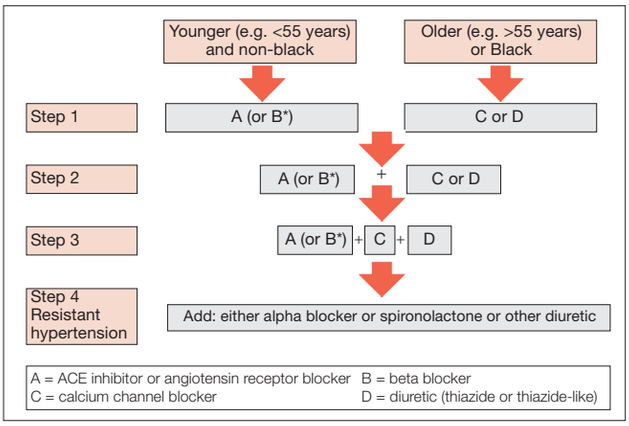
## Six Simple Ways to Lower Blood Pressure (Contd. from page 3)

**hours of sleep each night is linked to the lowest risk of raised blood pressure.** The study found that the riskiest sleep habit for blood pressure readings was 5 hours a night. Women were at greater risk from poor sleep than men.

Scientists have looked at a number of possible reasons why a lack of sleep could raise blood pressure but are still unsure. One theory is that cortisol levels are higher in people after they have had less sleep, which tends to cause vasoconstriction and elevate blood pressure. Other ideas are related to the "central biological clock" affecting blood pressure. This circadian rhythm responds to eating, light exposure, amount of activity, and sleep.If someone finds that they gasp for air while sleeping, they may need to be tested for obstructive sleep apnea (OSA), a secondary cause of high blood pressure. Controlling OSA with a machine at night to help with breathing can improve blood pressure.

6. **Use Pharmacotherapy if lifestyle modifications do not yield results.** A simple algorithm is included below.

**Treatment of Hypertension: Simple AB/CD Algorithm**




# Heart attack diagnosis in a minute

*Biosensors & Bioelectronics, 2016.*

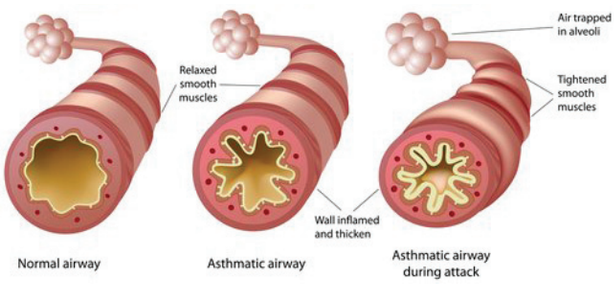
Heart disease is the leading cause of death for both men and women and, therefore, a fast and reliable diagnosis is urgently needed.

- **A novel immuno-sensory system** has been developed which works by **measuring the level of cardiac troponin I (cTnI), a protein that is excreted by the heart muscle into the blood following a heart attack.**
- **This new immuno-sensor using dielectro-phoretic forces is able to rapidly diagnose the level of heart attacks at the point of care,** as per researchers from the Ulsan National Institute of Science and Technology (UNIST) in South Korea.
- **Using just a single droplet of blood, this immunosensor detects the target protein present in the serum following a heart attack (cTnI) and provides the result in one minute.**
- According to researchers, this immunosensor holds **considerable potential for use as a platform for sensing distinct types of proteins,** along with the feasibility of miniaturization and integration for biomedical diagnosis.

# Vitamin D May Help Reduce Asthma Attacks

*Cochrane Database of Systematic Reviews, 2016.*

- **Asthma is a chronic disease that affects around 300 million people around the world, and presents with symptoms of wheezing, coughing, chest tightness and shortness of breath.**
- **A recent international clinical review has demonstrated that asthma sufferers could help reduce their risk of severe asthma attacks by taking Vitamin D supplements as well as their standard asthma medicines.**
  - The analysis, which covered trials in the US, Canada, India, Japan, Poland and Britain, found that **taking Vitamin D cut the risk of severe asthma attacks needing hospital treatment** to around three per cent from six per cent.
- Trials evaluating benefit of Vitamin D3 in children with asthma are also being planned.




## Laugh Out Loud

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