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Real-time clinical decision support systems for platelet and cryoprecipitate orders

Platelet and cryoprecipitate transfusions are often used to treat patients who are bleeding. However, many clinicians use non-evidence–based approaches to ordering and transfusing these products. Cost and such adverse effects as transfusion-transmitted diseases and transfusion reactions make it desirable to reduce the unnecessary transfusion of these products. The authors conducted a study in which they evaluated cryoprecipitate and platelet ordering practices after implementing real-time clinical decision-support systems in a computerized physician order-entry (CPOE) system. They implemented a uniform platelet and cryoprecipitate transfusion threshold at 11 hospitals in a regional health care system supported by the same CPOE system. The investigators collected data on the ordering physicians and the number of alerts generated by the clinical decision-support systems when orders were outside acceptable institutional guidelines. The results showed that of 1,889 platelet and 152 cryoprecipitate orders placed in six months, 58.3 percent and 48.7 percent triggered an alert, respectively. Transfusion orders that were cancelled after the alert ranged from 13.5 percent to 17 percent for platelets and zero to 50 percent for cryoprecipitates. The authors concluded that clinical decision-support system alerts reduce, but do not eliminate, platelet and cryoprecipitate transfusions that do not meet institutional guidelines. Many clinicians continued to order platelet and cryoprecipitate transfusions based on criteria that were not evidence based.

Collins RA, Triulzi DJ, Waters JH, et al. Evaluation of real-time clinical decision support systems for platelet and cryoprecipitate orders. *Am J Clin Pathol.* 2014;141:78–84.

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Plasma testosterone in the general population and cancer prognosis and cancer risk

Testosterone is a transcription factor in humans that causes tissue proliferation and increased basal metabolism and energy consumption. Previous studies have shown that testosterone stimulates the growth of lung and colon cancer cells in vitro, which may be associated with an increased risk of cancer. The authors conducted a study in which they tested the hypothesis that plasma testosterone is associated with an increased risk of cancer and early death after cancer. They measured plasma testosterone in 8,771 men and women 20 to 94 years of age who participated in a prospective study of the general population. The participants were followed for a median of 22 years (range, 0 to 30 years). Results showed that during followup, 1,140 men and 809 women developed cancer. Increased levels of testosterone were associated with a 30 to 80 percent increased risk of early death after cancer but an unchanged risk of incident cancer. The authors reported that this is the first population-based study to demonstrate the association between plasma testosterone and risk of early death. They concluded that their study did not show an association between testosterone levels and cancer risk. However, it did show that increased levels of plasma testosterone are associated with an increased risk of early death. This may be due to testosterone stimulating intracellular protein synthesis, which is needed for rapid proliferation of healthy and cancerous cells.

Orsted DD, Nordestgaard BG, Bojesen SE, et al. Plasma testosterone in the general population, cancer prognosis and cancer risk: a prospective cohort study. *Ann Oncol.* 2014;25:712–718.

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Temporal transcriptome changes triggered by relaxation response

The relaxation response is the opposite of the stress response and can be achieved through meditation, yoga, and repetitive prayer. The relaxation response (RR) is known to be an effective therapeutic intervention for stress in such disorders as hypertension, anxiety, insomnia, and aging. However, the underlying molecular mechanisms that explain the clinical benefits of the RR remain undetermined. The authors assessed rapid time-dependent (temporal) genomic changes during one session of RR practice among healthy practitioners with years of RR practice in comparison with novices before and after eight weeks of RR training. The authors measured the transcriptome in peripheral blood prior to, immediately after, and 15 minutes after listening to an RR-eliciting CD or a health education CD. The results showed that short-term and long-term practitioners underwent significant temporal gene-expression changes while practicing RR in comparison to novices. Of interest, RR evoked changes in genes associated with energy metabolism, mitochondrial function, insulin secretion, and telomere maintenance and reduced expression of genes linked to inflammatory response and stress-related pathways. More specifically, analyses of RR-affected pathways showed mitochondrial ATP synthase and insulin as top upregulated critical molecules and NF-κB pathway genes as top downregulated molecules. The authors concluded that the health benefits of the RR may improve mitochondrial energy production and utilization and promote mitochondrial resiliency through upregulation of ATPase and insulin function while downregulating NF-κB.

Bhasin MK, Dusek JA, Chang B-H, et al. Relaxation response induces temporal transcriptome changes in energy metabolism, insulin secretion and inflammatory pathways. *PLoS One.* 2013;8:1–13.

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