

# Heart surgery? Slate it for the afternoon, study says

October 27 2017

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Human heart. Credit: copyright American Heart Association

The risk of serious heart problems after open heart surgery nearly doubles when the operation is performed in the morning rather than the afternoon, researchers said Friday.

Experiments and [lab tests](#) pointed to our biological clock as the primary cause of the startling difference in outcomes, they reported in the medical journal *The Lancet*.

"Our study found that post-[surgery](#) heart damage is more common among people who have [heart surgery](#) in the morning," said lead author David Montaigne, a cardiologist at the University of Lille.

"The time of day—that is, the biological clock or circadian rhythm—influences the patient's reaction to this kind of operation," he told AFP.

The circadian clock governs the body's day-night cycles, thus influencing sleep patterns, the release of hormones, and even body temperature.

When disrupted—as with jetlag—repeatedly over long periods, it can aggravate depression, bipolar disorder, cognitive function, and memory formation, research has shown.

Earlier this month, the Nobel Prize for medicine was awarded to three US scientists who pioneered our understanding of how the circadian clock ticks.

The new study unfolded in four steps.

To start, scientists examined medical records for nearly 600 people who had surgery to replace heart valves, half in the morning, half in the afternoon.

Fifty-four of 298 afternoon patients experienced heart attacks or other major cardiac events in the 500 days after the operation, compared to 28 out of 298 of the morning patients.

Then, in a year-long clinical trial, 88 patients were randomly scheduled for morning or afternoon valve replacement surgery.

Not only did tissue from the afternoon group show less damage, it also regained the ability to contract more quickly in lab tests that mimicked the heart refilling with blood.

## High-risk patients

A genetic analysis of the same tissues showed hundreds of genes linked to [circadian rhythms](#) were more active in the afternoon group, suggesting that the heart, too, is influenced by our [biological clock](#).

Montaigne and his team deleted and replaced the corresponding genes in mice to study the impact on the transition between sleep to wakefulness, and vice versa.

Finally, they identified candidate drugs that might modulate these genes in such a way as to protect the heart during surgery.

"The authors have clearly shown that circadian rhythm is of clinical importance," commented Michel Ovize, a cardiologist from Louis Pradel Hospital, outside Lyon, France.

High-risk patients might be given preference for afternoon surgery in light of the findings, he suggested.

John O'Neill from the Medical Research Council Laboratory of Molecular Biology in Cambridge, England said the results were solid but "not hugely surprising".

"Just like every other cell in the body, heart cells have circadian rhythms that orchestrate their activity to anticipate the external rhythm of night

and day," he said.

"Our heart 'expects' to work harder during the day than at night."

But the discrepancy in outcomes between morning and afternoon operations might also be explained by variance in the biological clocks of the surgeons, he added.

"We know that hand-eye coordination, concentration and cognitive abilities are also affected by time-of-day," he said.

"The [circadian clock](#) may affect outcomes from heart surgery, but understanding why—and how to leverage this information—requires more research."

Humans have been shown to be either "owls" or "larks", corresponding to so-called genetic chronotypes that determines whether we function better at night or during the day.

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Citation: Heart surgery? Slate it for the afternoon, study says (2017, October 27) retrieved 28 April 2024 from <https://medicalxpress.com/news/2017-10-heart-surgery-slate-afternoon.html>

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