

Study proves that practice makes perfect in PCI for heart attack

February 9 2009

When it comes to treating heart attacks, experience matters. New research shows that patients have a much better chance of survival when both their hospital and their physician have a strong track record in treating heart attack with angioplasty and stenting.

The new research, published in the February 17, 2009, issue of the *Journal of the American College of Cardiology (JACC)*, found that the risk of dying was cut by nearly half when interventional therapy was performed by an experienced physician in a hospital with plenty of practice in providing the rapid, intense attention that heart attack patients need.

"Even in this day of advanced technology and advanced training, physician and hospital volume still matter, and they matter most in high-risk patients," said V.S. Srinivas, M.B.B.S., an associate professor of clinical medicine at Montefiore Medical Center in New York City. "In coronary interventions, nothing is higher risk than a heart attack."

The study focused on the effect of physician and hospital experience on patients who were treated with primary percutaneous coronary intervention (PCI). In this procedure, a heart attack is treated by inflating a tiny balloon that clears away a blood clot that is cutting off the blood supply to the heart. Usually the interventional cardiologist also places an expandable metal mesh tube, or stent, inside the artery to prop it open.

Today it is widely acknowledged that primary PCI is the safest and most effective treatment for heart attack—provided it can be accomplished quickly. As a result, many communities are establishing primary PCI programs to provide rapid, local care. This trend is raising questions, however. For example, in large cities that already have a primary PCI program, are more programs better for patients, if it means that each hospital and physician performs fewer cases? In smaller communities, can the benefit of having an experienced interventional cardiologist on staff overcome the inexperience of a fledgling primary PCI program that treats only a small number of heart attack patients each year?

The new research provides unique insight into such questions. Although previous studies have looked separately at the influence of physician and hospital experience on survival after primary PCI, this is the first study to evaluate the combined effect of these two factors since stent placement came into common use.

The interaction between physician and hospital experience is critically important, particularly in the case of an unforeseen complication, said James Jollis, M.D., an associate professor of medicine at Duke University in Durham, NC. Dr. Jollis did not participate in the study but was invited to write an editorial in the same issue of *JACC*.

"In most hospitals with angioplasty facilities, highly trained teams are on call 24 hours a day, 7 days a week," Dr. Jollis said. "These teams are composed of interventional cardiologists, nurses and technicians who work in a coordinated fashion to rapidly open blocked arteries. When rare but severe complications arise, a team experienced in its recognition and treatment may be the difference between life and death."

For the study, researchers analyzed data from the New York State PCI registry, a database that all New York hospitals are required to participate in. The data came from 7,321 patients treated with primary

PCI by 266 physicians at 41 medical centers between 2000 and 2002.

Hospitals performing an average of more than 50 primary PCIs each year were defined as high-volume centers, while those performing 50 cases or fewer each year were defined as low-volume centers. Similarly high-volume physicians were defined as those performing more than 10 primary PCIs each year, while low-volume physicians were defined as those performing 10 or fewer cases each year.

Patients who were treated at low-volume hospitals and by low-volume physicians tended to be older and sicker, and to have other characteristics that placed them at higher risk. But even when these factors were taken into account, being treated by an experienced physician in an experienced hospital was clearly associated with better survival after primary PCI.

Overall, in high-volume hospitals, the risk of dying in the hospital was 42 percent lower when compared to low-volume hospitals. Among patients treated by high-volume physicians, the risk of in-hospital death was 34 percent lower overall when compared to patients treated by low-volume physicians.

Researchers also examined the relationship between hospital volume and physician volume. In high-volume hospitals, the risk of in-hospital death was significantly lower among high-volume physicians when compared to low-volume physicians (3.8 percent vs. 6.5 percent, odds ratio: 0.58). In low-volume hospitals, there was a trend showing a lower risk of death among patients treated by high-volume physicians, as compared with low-volume physicians (4.8 percent vs. 8.4 percent, odds ratio: 1.44), but the difference was not statistically significant, due to the small numbers cases in this category.

These findings suggest that even in the most experienced hospitals, it is

important that primary PCI be performed by experienced physicians, Dr. Srinivas said. As for low-volume community hospitals, the study's findings offer indirect guidance.

"Even in high-volume hospitals, higher-volume physicians did better than lower-volume physicians. We would expect the same effect in low-volume hospitals," Dr. Srinivas said. "Therefore, it's all the more important that community hospitals that are developing primary PCI programs have experienced physicians."

Dr. Jollis advised outlying communities to also consider the alternatives to developing primary PCI programs, including establishing ambulance diversion plans to immediately take heart attack patients to the closest angioplasty hospital, if the travel distance is not too great. Use of clot-busting drugs is another alternative.

"All hospitals, including those lacking angioplasty teams, are capable of rapidly opening coronary arteries using clot-dissolving medicines. Thus, the closest hospital is the safest and best place to proceed," he said.

Source: American College of Cardiology

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