

Nik's Health Beat Coronary Stents—Controversy Over Bare-Metal or Drug-Coated Stents



By
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Since the introduction of coronary angioplasty by Andrea Gruentzig in 1977, for the treatment of coronary artery disease, we have seen monumental technological advances in terms of reaching the most remote and challenging blockages in the coronary arteries and treating them. We have discovered better methods of delivering the balloons, keeping the arteries open, and preventing the collapse of the arterial walls, by deploying the coronary stents thus reducing the incidence of acute coronary occlusions following coronary interventions. We also have newer medicines to prevent acute or chronic clot formation following a coronary intervention, by using the potent antiplatelet agents that prevent clot development.

With the introduction of the bare-metal stents (a steel wire mesh), we were able to prevent the arterial walls from collapsing and worsening the condition. It addressed one of the potential problems inherent during coronary interventions. However, with the introduction of a foreign object (stent), we learnt that the original atherosclerosis process or hardening of the arteries from

deposition of cholesterol was replaced by an entirely new problem namely, proliferation of the smooth muscle cells in response to a stent (foreign object). This smooth muscle proliferation encroaching onto the lumen had a tendency to cause restenosis of the coronary arteries in 30% to 50% of the patients who received these bare-metal stents, depending on the size and location of the stents.

In order to treat this new problem, patients had to undergo repeat interventions involving debulking (atherectomy), cutting balloon, and/or radiation, all of which have their own adverse effects. The radiation was found to be useful in reducing the smooth muscle proliferation.

In order to address the smooth muscle proliferation problem, the researches focused on anti-tumor drugs that that prevented cell duplication. This led to the introduction of stents coated with drugs embedded between two polymer layers. The drug was supposed to be released locally at the stent site, over 6-8 weeks, thus preventing the smooth muscle cell duplication. This concept, both in theory and practice, seemed like a novel approach, with one exception.

When we perform a balloon angioplasty or insert a bare-metal, we damage the inner lining of the arterial wall namely, the endothelium which acts as lubricant besides performing numerous other functions. The smooth surface covered the

damaged arterial wall and the bare-metal stent so that the normal arterial wall architecture was restored. This smooth endothelial layer also prevented any new blood clot formation.

However, among those patients who received drug-coated stents, there was a tendency for failure of the regeneration of the endothelial layer to cover the drug-coated stents. That exposed the metal to the blood surface and could act as stimulus for the formation of blood clot, months and years after the stent placement.

More recently, there have been alarming reports in the medical and the public media about the adverse effects of drug-coated stents months and years after their insertion. As more and more long-term reports have arrived, the alarm seems to be less than what was perceived to be initially, when the news reached the public. The latest research reveals that the incidence of acute clot formation in patients with drug-eluting stents is less than 0.5% per year. Even though the incidence is very small the complications from such an occlusion are very serious and startling. It is not very clear when these complications can occur, thus leaving us with uncertainty.

The outcomes of patients receiving drug-coated stents were not worse off than those who received bare-metal stents. Yet, those who received the drug-coated stents had fewer symptoms

and lesser incidence of stenosis or repeat interventions.

In order to address this very vital problem of clot formation, most cardiologists felt that patients who receive drug-coated stents must be on long term antiplatelet drugs. However, there is evidence in the literature that point to studies that have looked at patients who have been on antiplatelet drugs for up to one year from the time of the coronary stent placement. There is no research data available at the present time regarding whether patients need to be on antiplatelet drugs longer than one year. Most cardiologists are recommending that the patients should continue on the antiplatelet drugs, if they had no major complications from the drug, until such time we have a better understanding of the problem.

The antiplatelet drugs, simply prevent the clot formation, but they still do not address the issue inherent with the drug-coated stents--inhibition of the endothelial regeneration.

What is on the Horizon?

There is ongoing research to look at other methods of keeping the arteries from clogging up after an intervention. Some researchers have used the biodegradable stents with no metal involved. The polymers that keep the arterial walls from collapsing are dissolved over 8-12 weeks period. However, being a foreign object, the polymers themselves had a

tendency to stimulate the smooth muscle cells thus bringing back the problem we had with bare-metal stents. These biodegradable stents that were treated with drugs were shown to be more effective in preventing the smooth muscle proliferation. Yet, we are back to the same point, they also inhibited the endothelial regeneration like their predecessors.

In a span of less than 30 years, we have made more progress in the diagnosis and management of heart disease than we have in the past century before the seventies. Every novel concept comes with its own inherent challenges which takes us to the next level, and one day we maybe able to address the issues that are daunting the cardiologists and the researchers alike.

Medical management of coronary artery disease with aggressive cholesterol lowering, diabetes control, weight reduction, regular exercises, has shown very promising results, and they should be part of every heart patient's lifestyle or every person at a potential risk of developing heart problem. Consult with your cardiologist before stopping the antiplatelet drug as their might be an increased tendency for new clot formation in the first 90 days after stopping the drug.

I also encouraged to visit www.sugarlandheartcenter.com and learn more about Nikam's diet.

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