



Dr. Niranjan Awasthi: nanoparticle formulation of cytotoxic chemotherapy in combination with antiangiogenic agents: Potential for improving treatment outcome in gastric cancer

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Editor's note

The 4th Pearl International Academic Conference on GI Disease and Cancer was held in Foshan, China on December 6–7, 2019. During this conference, we were glad to interview Dr. Niranjan Awasthi (*Figure 1*) to share his perspectives on nanoparticle formulation and gastric cancer (*Figure 2*).

Expert's introduction

Niranjan Awasthi, PhD, is a senior research professor at the Department of Surgery, Indiana University School of Medicine in the USA. Having more than 20 years of research experience in various disciplines, and his laboratory research is focused on finding novel and more effective therapies for upper gastrointestinal cancers including pancreatic cancer, gastric cancer and cholangiocarcinoma.

Interview

DMR: *In your speech, you've introduced the potential of nanoparticle formulation of cytotoxic chemotherapy in combination with antiangiogenic agents in treating gastric cancer. Could you share your opinions for this therapy? Does it have any advantages and disadvantages compared with conventional therapy?*

Dr. Awasthi: About two-thirds of gastric cancer patients are diagnosed late, where surgery is not an option. Also, even after curative resection, recurrence is common. So, systemic chemotherapy is given as a fundamental treatment, which has several disadvantages. They have dose-limiting toxicities and sometimes it's life-threatening, and also one of the challenges is that a significant portion of drugs get degraded in the circulation after intravenous infusion, even before it reaches the tumor site. So, the nanoparticle

formulations of chemotherapy were investigated to avoid these disadvantages with conventional chemotherapy. And once you pack conventional chemotherapy drugs into nanoparticles such as albumin, liposome, carbon nanotubes, then these nanoparticle formulations have several advantages: it protects drugs from degradation in the circulation, minimum effect on normal cells, increase the retention time of the actual chemotherapy drug and more bioavailability. And also, there's some data available that indicates that these drugs make other drugs work better, so when you combine with any other targeted agents, such as anti-angiogenic agents, nanoparticle formulations of chemotherapy can enhance their efficacy. And, the only disadvantage I can think of, is the cost associated with these drugs. Because these are all newer drugs, so they might be still under patent and may be more expensive than conventional chemotherapy.

DMR: *Gastric cancer is the third most common cause of cancer-related death in the world, what would be your suggestion to prevent it, especially for young people?*

Dr. Awasthi: Sure. Gastric cancer results from several environmental factors, also due to the accumulation of several genetic alterations. Based on some known risk factors, my advice to young people is to limit the use of tobacco and alcohol, increase the intake of fruits and vegetables, maintain a healthy weight, and also should get involved in physical activities. Also, I think, if someone has a family history of this disease, they should be more aware of the risks and should get involved in the screening for early detection. Another thing I would say is that *Helicobacter pylori* (*H. pylori*) infection is a very common risk factor for gastric cancer. So, whenever patients have that, get it treated to eradicate it. These are the things that young people can take into account to avoid gastric cancer.



Figure 1 Dr. Niranjana Awasthi was speaking on the 4th Pearl International Academic Conference on GI Disease and Cancer held in Foshan, China.



Figure 2 Dr. Niranjana Awasthi in the interview.

DMR: *We know that you are having laboratory research at Indiana University School of Medicine, could you please share with us what's the main issues is focusing on?*

Dr. Awasthi: My lab at Indiana University School of Medicine in the United States is mainly focused on evaluating novel therapeutic upper GI cancers, pancreatic cancer, gastric cancer and cholangiocarcinoma or bile duct cancer. All these cancers are multifactorial and are diagnosed late. And systemic chemotherapy is the main treatment option for these cancers. The prognosis is very poor and patients don't survive long with these cancers. In our lab, we have established several animal models to evaluate the antitumor efficacy of novel therapeutic combinations to find a more efficacious treatment for these cancers. Once we find out that these novel therapeutic combinations are better than the current standard of care regimen, then we propose it for clinical trial evaluation and future clinical use.

DMR: *You have more than twenty years of research experience in various disciplines, so how do you keep passion when doing clinical researches?*

Dr. Awasthi: As you know, I have more than 20 years of research experience, and for the past 15 years, I am involved in cancer research. If you look into cancer data in 2003, 79% of the countries had heart disease as the number one killer, only 21% of countries had cancer as the number one killer. And in 2015, 41% of countries had cancer as the number one killer. In the United States, it is projected that this year 2020, cancer will surpass heart disease in all 50 states to become the number one killer. You can see that the cancer rate is increasing worldwide. I think the main reason is the aging population. Also, there are better treatments available for heart disease, and if you look into statistics these days, the chances of someone getting cancer is one out of two. Much higher than before. But it doesn't mean that we haven't made progress, we have made significant progress in the treatment of several cancers such as prostate cancer, breast cancer, testicular cancer, thyroid cancer, etc. These are now considered as the most curable cancers. The cancers in which I work are very difficult to treat, such as pancreatic cancer, gastric cancer, and cholangiocarcinoma. And fortunately, with the hard work of students in the lab, we have established several clinically relevant animal models to evaluate experimental therapeutics. Many new targets and new therapies are emerging, so we test these in our preclinical animal model, then predict their response to the patients. So for the question what keeps us passionate is that, if we keep adding a little bit to the patients' survival, they will live longer; and if we improve a little bit into their quality of life, that means we are succeeding in what we are doing. So, in that regard, we have worked on this drug called nab-paclitaxel, our animal studies played a major role in the approval of this drug for pancreatic cancer treatment. This drug nab-paclitaxel in combination with gemcitabine extended the patient survival by 2 months. In pancreatic cancer, patients' survival was just 6 months with the previous standard of care drug, so 2 months addition is a big deal, where you get a chance for evaluating tumors and come up with some other treatment options. And that keeps us passionate about working in these research areas. If we could have a successful combination therapy any day, that means there will have a meaningful impact on patients' survival and their quality of life.

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Footnote

Conflicts of Interest: The author has completed the ICMJE uniform disclosure form (available at <http://dx.doi.org/10.21037/dmr.2019.12.06>). AZ reports that she is a full-time employer of AME Publishing Company (publisher of the journal).

Ethical Statement: The author is accountable for all aspects of the work in ensuring that questions related

to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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