

Bevacizumab/Avastin

Name

Institution

Subject

Date

Introduction

If a patient has been diagnosed with a recurring malignant glioma, the doctor might administer a type of drug known as bevacizumab that is also referred as Avastin as its brand name. Bevacizumab belongs to a class of drugs popularly referred as the monoclonal antibodies, which are the type of medications that are designed to operate with proteins found within the surface of tumor cells. Antibodies are molecule produced by the human body in responding to a foreign antigen or invader. Therefore, the monoclonal antibodies are developed in a lab to inhibit and target proteins. Bevacizumab drugs were approved for treatment of cancer in the U.S in the year 2004 (Drug.com, (2017). According to the World Health Organization, bevacizumab is listed in the list of the most essential and safe medicines needed in the public health system, (World Health Organization, 2015).

Cancer that can be treated using Bevacizumab

Bevacizumab is a drug under the class of VEGFR/VEGF inhibitor and can be used as a medication for treating breast cancer, cervical cancer, fallopian tube cancer, colorectal cancer, macular degeneration, breast cancer metastatic, ovarian cancer, malignant glioma, glioblastoma multiform, pancreatic cancer, solid tumor, renal cell carcinoma, peritoneal cancer and non-small cell lung cancer.

A Common Cancer Disease treated by Bevacizumab

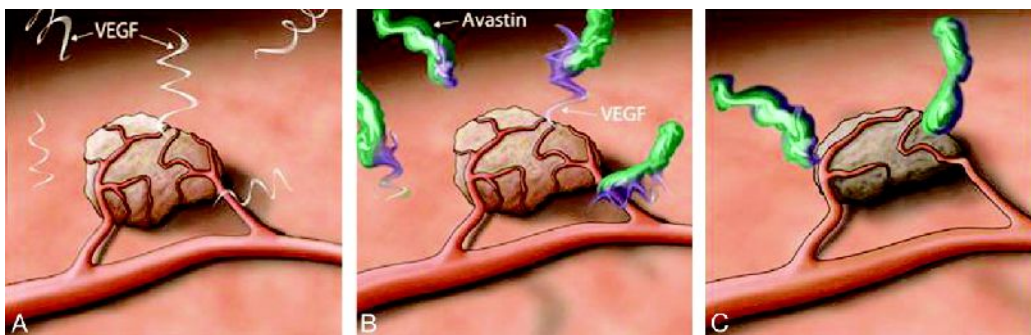
One of the common cancer disease that is treated by bevacizumab is lung cancer. Lung cancer is leading type of cancer-related death across the globe, with over 1.2 million deaths reported annually. The standard care of patients with lung cancer is platinum-based doublet chemotherapy. However, recent advancement in biology in understanding tumor growth have allowed doctors to use bevacizumab drug to target the VEGF and EGFR. As a pro-angiogenic

factor, VEGF binds membrane receptor, which promoted the growth of tumor and metastasis. The commonly utilized mechanism is the use of bevacizumab, which is a monoclonal antibody. Bevacizumab stands today as the only anti-angiogenic agent approved by FDA for the first-line treatment of non-small cell lung cancer.

Mechanism of Action

As a humanized monoclonal antibody, bevacizumab recognizes and lock specific receptors (proteins) that are present within the cancer cell surface. Once the drug reaches the target receptor, it activates the immune system and directs it to attack the cancer cells in order to destroy themselves. Specifically, bevacizumab binds its self to the VEGF-A protein in order to inhibit the process of angiogenesis as indicated in figure 1 below. Thereafter, the VEGF assist tumors in forming other new blood vessels as well as blocking. Hence, the VEGF helps to stop cancer from further development through its blood supply. This then reduces the supply of nutrients and oxygen, preventing the tumor to grow and survive. When starved from important nutrients, the tumor stops to grow. The estimated life of bevacizumab (drug action duration) is approximately 20 days while the time taken by the drug to achieve a steady-state concentration is about 100 days. Additionally, the distribution volume is 46 mL/kg depending on factors such as gender, body weight and size of tumor (Mandal, 2017).

Fig.1: Image of the mechanism of action of the Bevacizumab



Sources: Mukherji (2010).

In the above schematic image of the mechanism of action of the bevacizumab, *A*, shows a VEGT protein surrounding a hypervascular tumor. *B*, illustrate how the bevacizumab compound binds the VEGF and reduces its concentration. *C*, demonstrates the reduction of existing VEGF leads in weakened blood supply to the tumor and the shrinkage of tumor.

Side Effects of Bevacizumab

There are numerous side effects linked with the consumption of bevacizumab. In fact, side effects might happen either as a response to the drug or as a reaction to the infusion (Avery et al., 2006). Several examples of infusion side effects include skin rash, flu-like symptoms, angioedema, abdominal pain, and allergy. The use of the drug itself might cause vomiting, constipation, diarrhea, nausea, weakness, loss of appetite, mouth ulcers, resistance to drug and hypertension. Moreover, the use of bevacizumab might decrease the count of white blood cell and hence, make the patient more prone to infection.

To reduce some of the risks of treatment of side effects caused by bevacizumab, it is important for the patient to inform the doctor about other medication or supplement that the patient may be taking, including other prescription as well as non-prescription medicines.

References

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