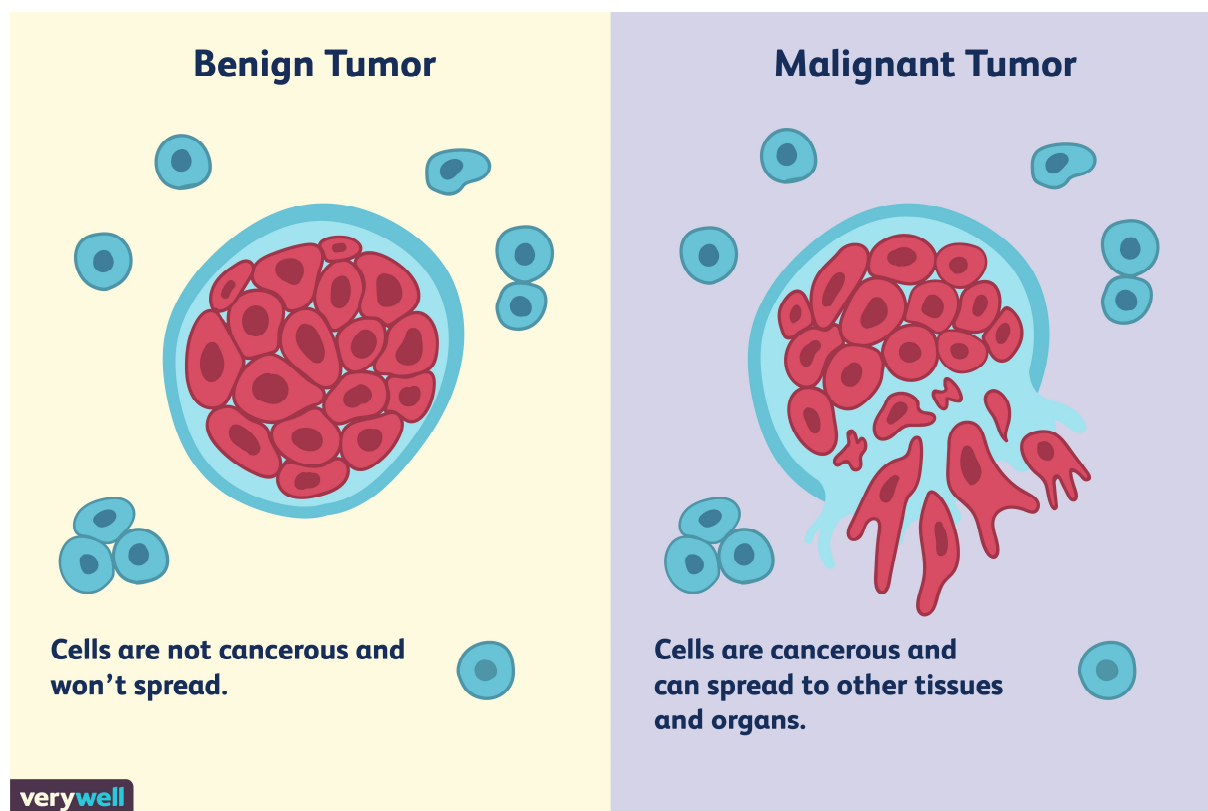# BREAST CANCER PREDICTION

1. PROBLEM UNDERSTANDING

Breast cancer, the most common cancer among women worldwide accounting for 25 percent of all cancer cases and affected 2.1 million people in 2015. Early diagnosis significantly increases the chances of survival.

The key challenge in cancer detection is how to classify tumours into malignant or benign. Machine learning techniques can dramatically improve the accuracy of diagnosis. Research indicates that most experienced physicians can diagnose cancer with 79 percent accuracy while 91 percent correct diagnosis is achieved using machine learning techniques. In this case study our task is to classify tumours into malignant or benign tumours using features obtained from several cell images. Let us look at the cancer diagnosis and classification process. So, the first step in the cancer diagnosis process is to do what we call it fine needle aspirate or FNA process which is simply extracting some of the cells out of the tumour. And at that stage we do not know if that tumour is malignant or benign. When we say malignant or benign as you guys can see these are kind of the images of the cell. This would be benign tumour and on the right side is the malignant tumour.

Benign Tumor

Cells are not cancerous and won't spread.

Malignant Tumor

Cells are cancerous and can spread to other tissues and organs.

verywell

And when we say benign that means that the tumour is kind of not spreading across. The body of the patient is safe somehow. However, if it is malignant that means it is cancerous. That means we need to intervene and stop the cancer growth.

Alright?

So, what we do here in the machine learning aspect, so now as we extracted all these images and we want to specify if that cancer out of these images is malignant or benign, that's the whole idea. So, what we do with that, we extract out of these images some features. When we say features that mean some characteristics out of the image such as radius for example of the cells such as texture, perimeter, area, smoothness and so on. And then we feed all these features into our machine learning model which is kind of a brain in a way.

OK?

The idea is we want to teach the machine how to basically classify images or classify data and tell us OK if it is malignant or benign. For example, in this case without any human intervention which is going to train the model. Once the model is trained, we are good to go. We can use it in practice to classify new images as we move forward.

All right.

And that's kind of the overall procedure or the cancer diagnosis procedure. And by that we conclude the problem case. And now let us shift into some of the medical terms.

2. Background and History

Breast cancer became the most common cause of death than any other type at Government Cancer Hospital. An increase of 63% in death of female patients suffering from breast cancer was recorded in 2019 at the hospital. The fatality figures of the associated hospital of Mahatma Gandhi Memorial Medical College, show that 36 females died of breast cancer in 2019 as compared to 22 in 2018.

In the year 2019, breast cancer emerged as top cancer killer causing 15.92% of the total deaths, followed by blood cancer, tongue cancer, and vaginal cancer combined constituting 14.15 %, 7.07% 6.19% of total toll, respectively. However, in the year 2018, blood cancer constituted 14.45% of total deaths, followed by breast cancer at 8.83%, vaginal cancer at 7.63% and oesophagus at 6.42%.

Blaming modern lifestyle for increase in number of breast cancer, the hospital superintendent Dr Ramesh Arya said, "Breast cancer has witnessed a rise because of modern lifestyle, junk foods and less physical exercise in daily routine. Also, surge in consumption of contraceptives pill by women and late marriages leading to delayed pregnancy are major reason behind increase in number of breast cancer patients."

The figures also show 6% increase in total female deaths the previous year. The female patients constituted 47.38% of the total deaths in 2018 as compared to 53% of in 2019 despite a decline of 10% death due to cancer and A dip of 3.26% in new cancer patients. The number of cancer patients coming up for follow-up in 2019 in comparison to 2018 also seen a decline of 17.51%.

A cancer expert Dr Rakesh Taran said, "The number of breast cancer patients has risen as a result of a stressful life, increase in consumption of food with extra cheese, fats along with increased usage of non-reusable plastic."

"The relative risk of breast cancer has increased also due to delayed lactation and less children", said Taran adding that "reporting of cancer has increased in last few years due to rise in awareness and health facilities and support through various health schemes."

In 2018, the country reported 162,468 new breast cancer cases and 87,090 deaths among women. Overall, 1 in 28 women is likely to develop breast cancer during her lifetime.

3. Should you be afraid then?

No, not at all! You do not have to be afraid; you need to be **'alert'**, you need to be **'aware'**. Western countries like the US began their breast cancer awareness programmes way back in the 1980s, and as a result of those efforts, finally the death rate due to breast cancer started showing decline, for the first time, in early 2000s. It took them two to three decades to achieve that. So, you can imagine the roadmap for India - we have not even started - we have a long, long way to go.

Correct information is... half the war won already.

4. Conclusion

Moral of the story: Breast cancer cannot be prevented. If it must happen, it will happen. However, the deaths due to breast cancer can be reduced. And that can be done, only and only by **'being aware'** of symptoms of breast cancer and reporting to doctor on time. A stitch in time saves nine. Saves lives. Read on about early detection of breast cancer.