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A System Study on Melanoma Skin Cancer in Medical Diagnosis

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Abstract: *Cancer refers to cells that grows out of its control and affect other tissues. Other Cells may become cancerous due to the accumulation of defects, or mutations in their DNA. Certain inherited genetic infections can increase the risk of cancer. Some of the environmental factors and poor lifestyle such as smoking and heavy alcohol can also damage DNA and lead to cancer. Most of the time, cells are able to detect and repair DNA damage. If a cell is severely damaged and cannot repair itself, it usually undergoes so-called programmed cell death or apoptosis. Cancer occurs when damaged cells grow, divide, and spread abnormally instead of self-destructing as they should. Melanoma is a type of skin cancer raised from uncontrolled proliferation of melanocytes [3].It is a highly aggressive one , due to its drastic potential it replicates and metastasizes to other organs. It can be resisted once exposed to conventional radiotherapy and chemotherapy. Metastatic spread has been accounted as the main reason for the mortality in melanoma. The patients with metastatic melanoma have poor survival of maximum 8 months to 5-year survival less than 5%.Therefore, it is essential to reveal the factors involved in the progressive growth of melanoma and metastasis strategies to overcome this disease. Detection of melanoma at an early stage is crucial to improving survival rates in melanoma.*

Keywords: skin cancer, Melanoma, Dermoscopy, lesions DNA, metasis, and melanocytes.

1.INTRODUCTION

Cells may become cancerous due to the accumulation of defects, or mutations, in their DNA. Certain have some inherited genetic defects. A tumor is an abnormal mass of cells. Tumors[1] can either be of benign (non-cancerous) or malignant (cancerous) types.

Benign Tumors Benign tumors grow locally but they do not spread. So benign tumors are not considered as cancer. They can still be dangerous, especially if they not treated.

Malignant Tumors Malignant tumors have the ability to spread and invade other tissues. This process,known as metastasis. We can see different types of malignancy based on where a cancer tumor originates.

Metastasis is the process whereby cancer cells break free from a malignant tumor and travel to and invade other tissues in the body. These metastatic tumors are "secondary cancers" because they arise from the primary tumor.

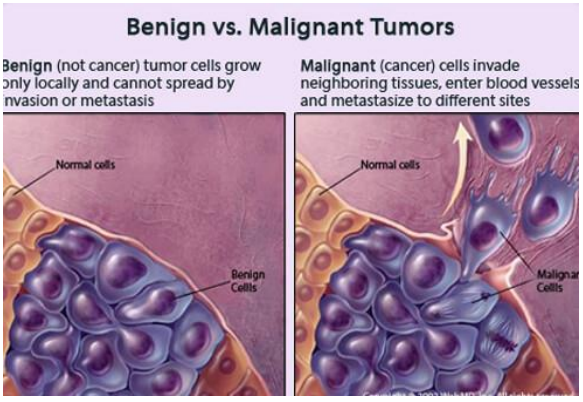

Fig - 1: BENIGN VS MALIGNANT TUMORS

TYPES OF CANCER

Carcinomas are cancers which occur in epithelial tissues in the body. They comprise 80% to 90% of all cancers. Most breast, lung, colon, skin, and prostate cancers are carcinomas.

Sarcomas occur in place of the connective tissue like the bones, cartilage, fat, blood vessels, and muscles.

Myelomas are cancers that occur in plasmic cells in the bone marrow. This class of cancer includes multiple myeloma, also known as Kahler disease.

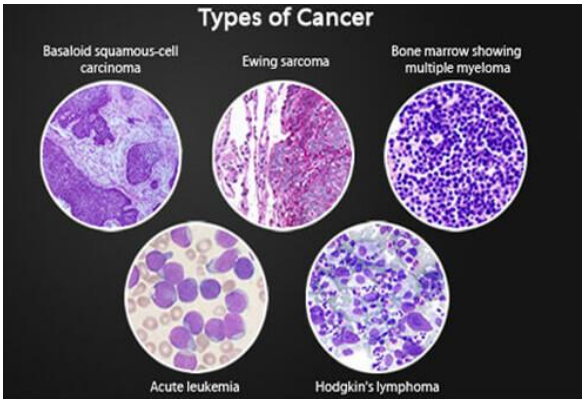

Fig -2: Types of Cancer

CLASSIFICATION OF SKIN CANCER

The stages of cancer are classified based on its size, location, and extent of spread. Staging helps doctors to determine the prognosis and treatment for cancer. The TNM staging system classifies cancers according to:

- Tumor (T): Primary tumor size.
- Nodes (N): Spread of cancer to lymph nodes.
- Metastasis (M): Spread of cancer to distant sites away from the primary tumor.

STAGES OF CANCER

The TNM classification of a cancer usually correlates to one of the following five stages.

- Stage 0: refers to cancer that is "in situ," meaning that cancerous cells are confined to their site of origin. This type of cancer has not spread and is not invading other tissues.
- Stage I – Stage III: This higher stages of cancer correspond to larger tumors . Cancers in these stages may have spread beyond the site of origin to invade regional lymph nodes, tissues, or organs.
- Stage IV: This type of cancer has spread to distant lymph nodes, tissues, or organs in the body far away from the site of origin.

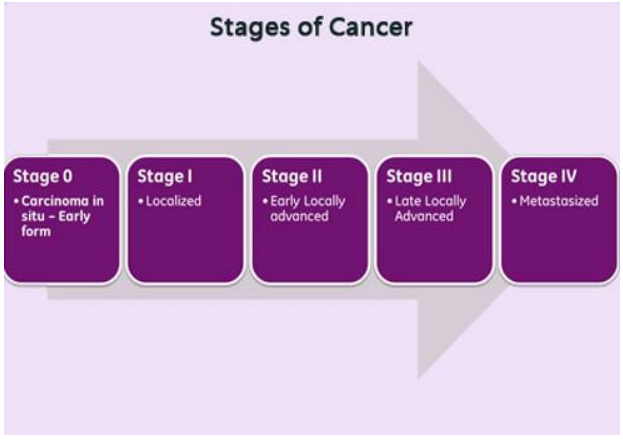

Fig - 3: Stages of Cancer

2. MELANOMA SKIN CANCER:

Benign tumors [1] that start in melanocytes[3].A mole is a benign skin tumor that develops from melanocytes. It. Almost everyone has some moles. Nearly all moles are harmless but having some types can raise risk of melanoma [5].

Types

There are different types of melanoma. They are listed below.

SUPERFICIAL SPREADING MELANOMA

Superficial spreading melanoma [5] tends to start growing outwards rather than downwards into the skin. It out of risk in spreading to other parts of the body until it begins to grow downwards deeper into the layers of skin and beyond. It is the most common type can be found in middle aged people.

NODULAR MELANOMA

Nodular melanoma[5] tends to grow downwards, deeper into the skin, quite spread fastly if not removed. There is often a raised area on the skin surface with this type of melanoma. Nodular melanoma often looks very dark brownish black, or black, in color.

LENTIGO MELANOMA

It (makes) gets greater, stronger, more complete from very slow growing colored areas of skin called lentigo. The lentigo maligna is flat and grows in the out-direction in the top levels of the skin. Mostly come into view as in areas of skin that have higher making open to sun, so are most common come to mind on the face.

ACRAL LENTIGINOUS MELANOMA

Acral lentiginous melanoma [5] is commonly found on the palms of the hands and soles of the feet. It can also grow under the nails. It is much more common on the feet than on the hands. This type is rare one. But it is the most common type of melanoma which can occur in dark skinned people.

AMELANOTIC MELANOMA

Amelanotic means without melanin. Melanomas tend to be dark in color, but amelanotic melanomas usually have no or very little color pigmentation . Occasionally they are pink or red, or have light brown or grey around the edges. They are often difficult to diagnose because of their lack of color and may be mistaken for other conditions of the skin.

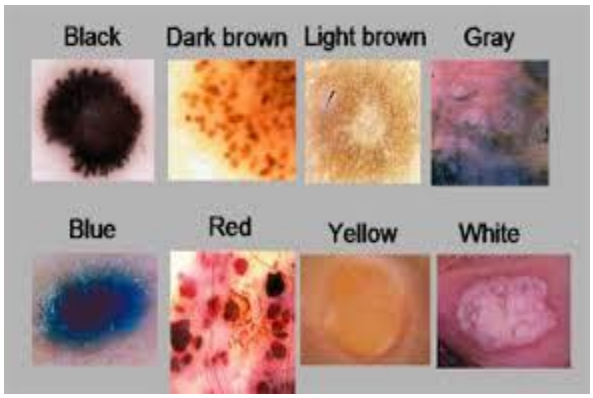

Fig - 4: Tumor Classification Based on Color and Growth

3. DIAGONISING THE MELANOMA STAGE

The stage[2] of a melanoma tells you how deeper it has penetrated into the skin, and how far it has spreads.

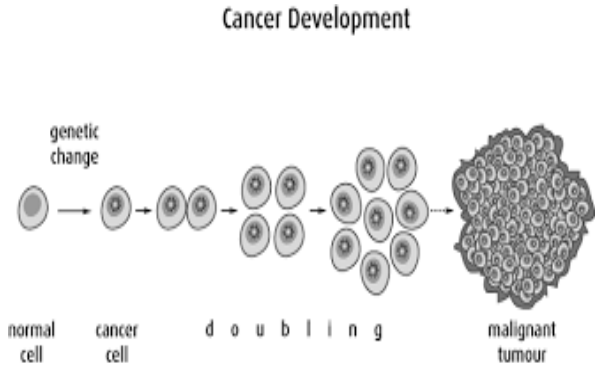

Fig - 5: Cancer Development

TNM STAGING

TUMOR Tumor describes the thickness of the melanoma. There are 5 main stages of tumor thickness in melanoma – Tis to T4.

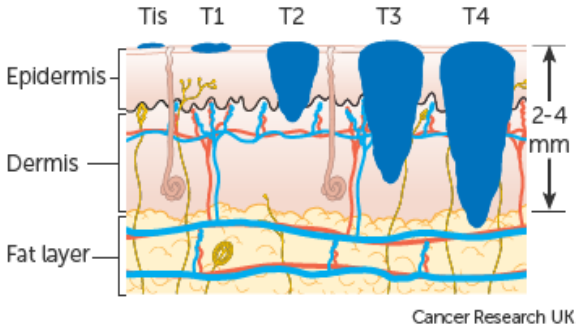

Fig - 6: T STAGING

TUMOR	Tis	T1	T2	T3	T4
T part is further divided into 2 groups, a and b, depending on ulceration. This describes whether or not the skin covering the tumor is broken. **Ta** means the melanoma is not ulcerated **Tb** means the melanoma is ulcerated	Melanoma cells are only in the very top layer of the skin surface.	melanoma is less than 1 mm thick **T1a** melanomas are not ulcerated and have a mitotic rate of less than 1/mm (squared) **T1b** melanomas have a mitotic rate of 1/mm (squared) or more	melanoma is between 1 mm and 2 mm thick	melanoma is between 2 mm and 4 mm thick.	the melanoma is more than 4 mm thick

Table - 1: TUMOUR STAGING

NODES (N) There are 4 stages describing whether cancer cells are in the nearby lymph nodes or lymphatic ducts – N0 to N3.

NODE (N)	N0	N1	N2	N3
N part of the stage is further divided into a, b and c. **Na** the cancer in the lymph node seen by microscope **Nb** means signs of cancer in the lymph node **Nc** means that there are melanoma cells in small areas of skin very close to the primary melanoma	nearby lymph nodes don't contain melanoma cells	melanoma cells in one lymph node	melanoma cells in 2 or 3 lymph nodes	melanoma cells in 4 or more lymph nodes

Table - 2: NODE STAGING

Metastasis (M)

There are 2 stages of metastasis – M0 and M1

Metasis(m)	
M0	cancer hasn't spread to another part of the body.
M1	cancer has spread to another part of the body.

M1 a	melanoma cells in the skin in other parts of the body or in lymph nodes far away from where the melanoma started growing
M1 b	melanoma cells in the lung
M1 c	melanoma cells in other organs, or the melanoma causes a high level of a chemical made by the liver.

Table - 3: Metastasis Staging

Doctors uses a number staging system or they use a scale to describe depth of the melanoma which has penetrated into your skin. These scales are called the Clark scale[4] and the Breslow scale[4]. They use 2 scales to describe the depth of the melanoma has gone into the skin.

- Clark scale
- Breslow scale

These scales are different to the number staging system in earlier staging ways of doing. The Clark and breslow scales only look at the distance down of melanoma units in the skin. The number stages look at the melanoma distance down, and also whether to make out the melanoma has put out on top to lymph nodes or another part of the body or not.

CLARK SCALE

The Clark scale is a way to measure depth of melanoma grown into the skin and predicts the levels of the skin being affected. You can see the main layers of the skin in this diagram.

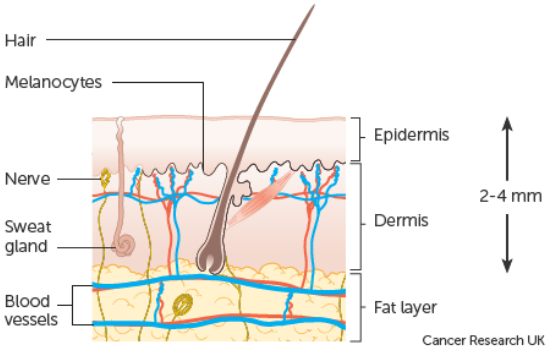

Fig - 6: Layers of Skin

The Clark scale has 5 levels:

Level 1 Melanoma cells are only in the outer layer of the skin (the epidermis)

Level 2 Melanoma cells in the layer directly under the epidermis (the papillary dermis)

Level 3 Melanoma cells are throughout the papillary dermis and touching on the next layer down

Level 4 Melanoma has spread into the reticular or deep dermis

Level 5 Melanoma has grown into the layer of fat under the skin

BRESLOW SCALE

Breslow scale, the pathologist measures the thickness of melanoma with a ruler, called micrometer. pathologist examines the melanoma cells in the laboratory. Breslow scale is the primary tumor thickness scale, or the Breslow thickness. It is measured in millimeters (mm) and to identify the melanoma cells intrude down through the skin from the surface.Doctors use the Breslow thickness in the TNM staging system for melanoma.

LEVELS OF IDENTIFYING THICKNESS USING BRESLOW SCALE

STAGE	A	B	C
STAGE 0 The stage 0 cells are seems to be non cancerous ,But if they are not treated, develop into invasive cancer.	-	-	-
STAGE 1 Stage 1 can be divided into 1A, 1B.	melanoma is less than 1mm thick The covering layer of skin over the tumor is not broken	The melanoma is less than 1mm thick and the skin is broken.It is between 1 and 2mm and is not ulcerated.	
STAGE 2 Stage 2 can be divided into 2A, 2B and 2C.	The melanoma is between 1 and 2 mm thick and is ulcerated.It is between 2 and 4mm and is not ulcerated • T2b, N0, M0 • T3a, N0, M0	The melanoma is between 2 and 4mm thick and is ulcerated.It is thicker than 4mm and is not ulcerated • T3b, N0, M0 • T4a, N0, M0	Stage 2C is the same as T4b, N0, M0
STAGE 3 Stage 3 means that cancer cells have spread into skin, lymph vessels, or lymph glands close to the melanoma. Stage 3 can be divided into 3A, 3B and 3C.	upto 3 nearby lymph nodes contain melanoma cell these nodes are not enlarged and the cells can only be seen under a microscope. our melanoma is not ulcerated and has not spread to other areas of the body • T1- T4a, N1a, M0 • T1- T4a, N2a, M0	melanoma is ulcerated and has spread to between 1 and 3 nearby lymph nodes but the nodes are not enlarged and the cells can only be seen under a microscope. • T1-4b, N1a, M0 • T1-4b, N2a, M0 • T1-4a, N1b, M0 • T1-4a, N2b,M0 • T1-4a, N2c, M0	lymph nodes contain melanoma cells, and there are melanoma cells in the skin or lymph channels close to the main melanoma. T1-4b, N1b, M0 • T1-4b, N2b, M0 • T1-4b, N2c, M0 • Any T, N3, M0
STAGE 4	It means that your melanoma is advanced. These melanomas have spread elsewhere in the body, away from where they started (the primary site) and the nearby lymph nodes. The most common places for melanoma to spread include the lung, liver,bones,brain,tummy (abdomen),distant lymph nodes	-	-

Table - 3: BRESLOW SCALING

4. TREATING TUMOR

The stage of your cancer helps doctor to decide what treatment to be done . Treatment can be changed depends on the place of cancer and other health conditions

Surgery is the foremost best treatment. Doctors must remove the abnormal mole and a small area of surrounding the skin. We will usually have a second operation to remove a larger area of healthy tissue around place of melanoma said to be local excision. If to test your lymph nodes. The test is called a sentinel lymph node biopsy and you usually have it under a general anaesthetic
If it is advanced melanoma then you might have:

- biological therapy
- chemotherapy
- radiotherapy
- if we need surgery to remove the melanoma. Then you have a wide local excision to do it and it removes more tissue in the area where the melanoma was.
- If the melanoma has spread to the lymph nodes, it needs to make surgery to remove all of the lymph nodes in the area near the melanoma. This operation is called a lymph node dissection
- Some other advanced therapies Targeted or Biological Therapies, Hematopoietic Stem Cell Transplants, Angiogenesis Inhibitors, Cryosurgery, Photodynamic Therapy[8] are also used for destroying melanoma cells.

5. RESULTS AND DISCUSSION

The examples once given in to the laboratory can be processed with several diagonising expert ways of art and so on. The image of skin which is of directions at right angles to every other size of the example and of greatest point distance across circle and high level of all. wound are recorded in millimeters. The existence or being away of substance to make another color in look-out lymph nodes are recorded to support its look-out net-work point position, and if any macroscopic error are noted. More lately, it has been took as having authority that different types of serious, violent melanoma have different types and have rates on a hundred of mutational abnormalities. This is an important development in view of the name person when meeting for first time of special marked process fornstaging errors.

The melanoma[9] thickness constitutes a vitally important factor for clinically localized primary cutaneous[7] malignant melanoma. Melanoma thickness signifies increasing risk and is correlated with reduced survival.By computing pT1/2 (≤1.0/≥1.01 mm), pT2/3 (≤2.0/≥2.01 mm) and pT3/4 (≤4.0/>4.0 mm) boundaries. If a thickness of 1.01 mm is pT2 but if the measurement is taken to the nearest one decimal point and recorded only as 1.0 mm, this then reflects pT1.At the staging boundaries, measurement to two decimal places will be required to reduce ambiguity in staging boundaries A mitotic rate is the powerful adverse feature for melanoma. The terms 'mitotic index' or 'count' are preferred because the proportion of cells that contain mitotic figures.

The existence of lymph vascular attack and take by force connects with a worse selection of the strongest in melanoma. The neurotropism includes the existence of melanoma around the nerve threads. medical staging includes micro staging of the first melanoma and clinical/radiologic put value for metastasis. By Convention, it should be used after complete taking out with a cut of the first melanoma with medical Assessment for part-wise and be far away metastasis.

Variable	Univariate			Multivariate		
	HR	95% CI	*p*-value	HR	95% CI	*p*-value
Breslow	138.5	3.3-5754	0.009	13.1	0.2-972.5	0.243
Ulceration	13.4	5.9-30.5	4.00E-07	4.2	1.76-10.1	0.001
Mitotic	2.8	0.9-9.3	0.089	2.0	0.6-6.9	0.288
GEP test	20.3	7.0-58.9	5.13E-07	5.0	1.4-17.4	0.011

Table - 4: Univariate and Multivariate of multi scales

6. CONCLUSION

In this paper, I have presented some ideas to work out and to pleasure melanoma skin cancer . Automatic diagnosis of skin cancer is possible and doable through the use of well formed order way of doing. While much a good outcome has been recorded in the current moves-forward in automation of medical diagnosis , this work-place takes care of to make ready knowledge in in connection with to different skin cancers and to diagnosis the diseased growth (in body) based on the image put acquired.And it seems to be good-price, more comfortable and quicker diagnosis in pre-stage it-self. as an outcome of that, if their application is oversaw by an experienced pathologist and if they are used according to their most high-skilled amount of room (changing over frequently from one to another with other techniques according to the purpose) will be in very small grains way of putting things right for man. We come to belief by reasoning that the methods of a diagnosis for skin wound in earlier stage and therapies ready (to be used) for different stages of melanoma.

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BIOGRAPHIES

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