Cancer Association of South Africa (CANSA)

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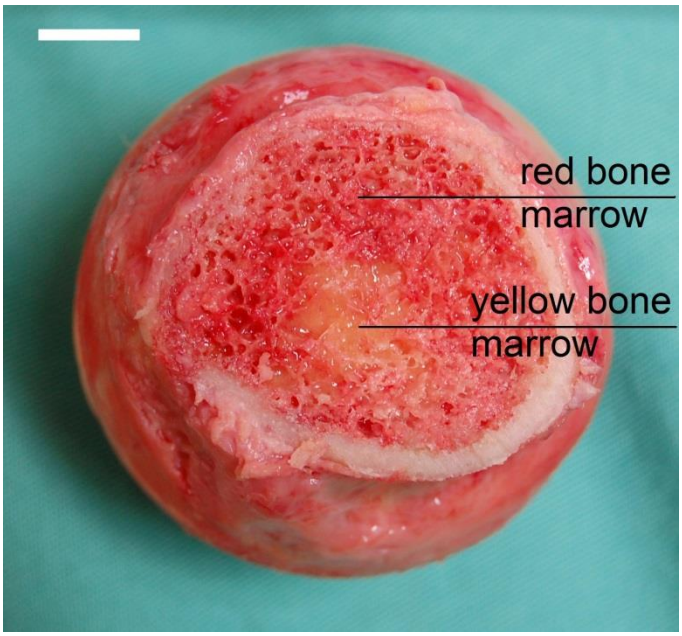
Fact Sheet
on
Multiple Myeloma

Introduction

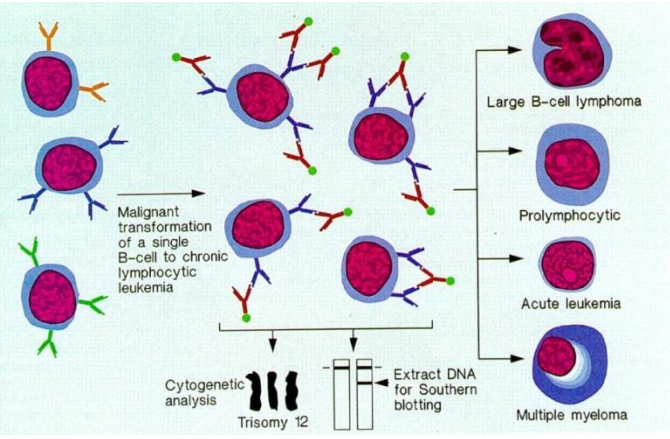
Multiple myeloma, also known as myeloma, is a haematologic cancer, or cancer of the blood.



[Picture Credit: Bone Marrow]

Multiple myeloma develops in the bone marrow, the soft, spongy centre of most bones. Myeloma typically occurs in bone marrow with the most activity, in the marrow in the spine, pelvic bones, ribs and area of the shoulders and hips. Many blood cells are produced in the bone marrow; myeloma affects plasma cells, cells that produce immunogobulins (antibodies) that help fight infection and disease.

[Picture Credit: Malignant Myeloma Cells]



In multiple myeloma, normal plasma cells transform into malignant myeloma cells and produce large quantities of an abnormal immunoglobulin called monoclonal (M) protein. The malignant cells also crowd out and inhibit the production of normal blood cells and antibodies in the bone marrow. In addition, groups of myeloma cells cause other cells in the bone marrow to remove the solid part of the bone and cause soft spots in the bone. These soft spots, also called osteolytic lesions, and other signs

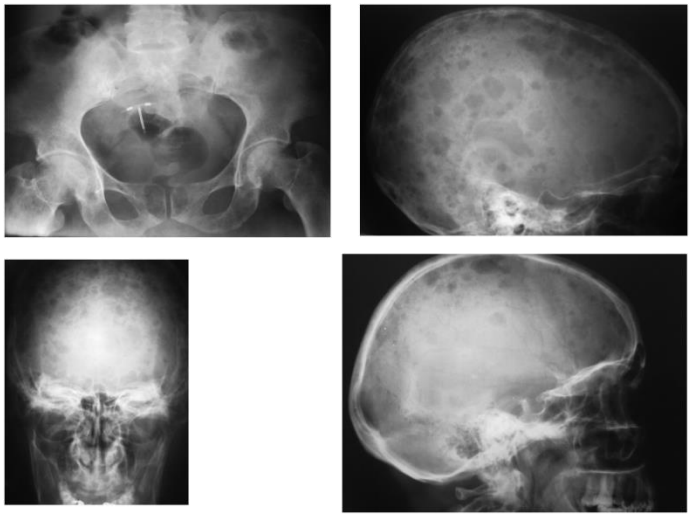
Researched and Authored by Prof Michael C Herbst
[D Litt et Phil (Health Studies); D N Ed; M Art et Scien; B A Cur; Dip Occupational Health; Dip Genetic Counselling; Dip Audiometry and Noise Measurement; Diagnostic Radiographer; Medical Ethicist]
Approved by Ms Elize Joubert, Chief Executive Officer [BA Social Work (cum laude); MA Social Work]

of bone loss are common with myeloma, although they do not occur in all individuals with myeloma.

Osteolytic Lesions

Osteolytic lesions, also called osteoclastic lesions or lytic lesions (for short), are characteristic areas of damage caused by myeloma. When myeloma invades bone tissue, it causes weak areas to form. In addition, the myeloma cells release chemicals that also lead to bone breakdown. The result is lesions with a specific 'punched-out' appearance that may occur in any bone in the body, but are most often noted in the spine, skull, pelvis and ribs.

[Picture Credit: Osteolytic Lesions]



Incidence of Multiple Myeloma in South Africa

According to the National Cancer Registry (2017) the following numbers of Myeloma cases were histologically diagnosed in South Africa during 2017. Histologically diagnosed means that a specimen (biopsy) was taken and forwarded to a recognised laboratory where a specially trained pathologist confirmed a diagnosis of cancer.

Group - Males 2017	Actual No of Cases	Estimated Lifetime Risk	Percentage of All Cancers
All males	204	1:792	0,51%
Asian males	6	1:923	0,62%
Black males	87	1:1 292	0,65%
Coloured males	24	1:656	0,51%
White males	87	1:383	0,39%

Group - Females 2017	Actual No of Cases	Estimated Lifetime Risk	Percentage of All Cancers
All females	185	1:1 160	0,44%
Asian females	8	1:839	0,62%
Black females	87	1:1 809	0,46%
Coloured females	22	1:1 018	0,48%
White females	68	1:584	0,40%

The frequency of histologically diagnosed cases of Myeloma in South Africa for 2017 was as follows (National Cancer Registry, 2017):

Group - Males 2017	0 – 19 Years	20 – 29 Years	30 – 39 Years	40 – 49 Years	50 – 59 Years	60 – 69 Years	70 – 79 Years	80+ Years
All males	0	1	6	29	65	53	44	15
Asian males	0	0	0	2	0	1	3	0
Black males	0	1	5	18	30	21	9	3
Coloured males	0	0	0	1	5	6	9	3
White males	0	0	1	8	21	25	23	9

Group - Females 2017	0 – 19 Years	20 – 29 Years	30 – 39 Years	40 – 49 Years	50 – 59 Years	60 – 69 Years	70 – 79 Years	80+ Years
All females	0	0	4	17	54	54	39	17
Asian females	0	0	0	1	1	3	3	0
Black females	0	0	4	14	33	23	9	4
Coloured females	0	0	0	2	5	9	4	2
White females	0	0	0	0	15	19	23	11

N.B. In the event that the totals in any of the above tables do not tally, this may be the result of uncertainties as to the age, race or sex of the individual. The totals for 'all males' and 'all females', however, always reflect the correct totals.

Symptoms of Multiple Myeloma

Myeloma may not cause any symptoms in the early stages of the disease. Occasionally, it is diagnosed following a routine blood test before any symptoms develop. When symptoms do occur, they are mostly caused by a build-up of abnormal plasma cells in the bone marrow, and by the presence of the para-protein in the blood.

Bone pain - The most common symptom of myeloma is bone pain. About 70% of people complain of lower back pain, or pain in their ribs. The pain happens because too many abnormal plasma cells are crowding out the bone marrow, which can damage the bone. Other bones may be affected too, such as the skull or pelvis.

Kim., C., Bhatta, S., Cyprien, L., Fonseca, R. & Hernancez, R.K. 2018.
"Skeletal-related events (SREs) are common bone complications in multiple myeloma (MM). However, there are few real-world reports of their incidence. In this study, a database of oncology electronic health records was linked to administrative claims data. Patients identified were aged ≥18 years and newly diagnosed with MM, had ≥1 clinic visit within 1 month of diagnosis, and ≥1 year of follow-up after diagnosis. The study period was January 1, 2011 to December 31, 2016. 343 patients were included, 35% of whom had a baseline history of any SRE. During a median follow-up of 25.7 months, 34% of patients experienced SREs after diagnosis. Median time to SRE was 167 days. Among patients experiencing an SRE, 68% had an SRE within the first year. The incidence rate of SREs at 1 year following MM diagnosis for patients with baseline history was 103/100 person-years (PY) versus 16/100PY for patients without baseline history. SRE incidence rates within 3 months of initiating a line of therapy increased with subsequent lines (line 1: 81/100PY, line 2: 118/100PY, line 3: 150/100PY). Risk of SREs was similar across different anti-MM regimens, including proteasome inhibitor-based regimens. These results highlight the importance of continued surveillance and management of MM-associated bone disease."

Other symptoms may include:

- tiredness and fatigue due to a lack of red blood cells (anaemia)

- kidney problems, which are caused by the para-proteins produced by the myeloma cells. They can also cause tiredness and anaemia
- repeated infections, particularly chest infections, due to a shortage of normal antibodies
- loss of appetite, feeling sick, constipation, depression and drowsiness, which are caused by too much calcium in the blood (hypercalcaemia)
- unexplained bruising and abnormal bleeding, for example nosebleeds or bleeding gums, due to a reduced number of platelets in the blood
- weight loss

If a person has any of these symptoms, it is important to see a doctor as soon as possible. Many of these symptoms can also occur in other conditions - most people with these symptoms will not have multiple myeloma.

Causes and Risk Factors for Multiple Myeloma

No cause for myeloma has so far been identified. Some research has suggested possible associations with a decline in the immune system, specific occupations, exposure to certain chemicals (heavy metals), and exposure to radiation. Exposure to herbicides, insecticides, petroleum products, heavy metals, plastics, and various dusts including asbestos also appear to be risk factors for the disease. However, none of these associations is strong, and in most cases, multiple myeloma develops in individuals who have no known risk factors.

Genetic factors may also be involved in the development of multiple myeloma. Learn more about genetic abnormalities in multiple myeloma. Researchers believe that multiple myeloma is most likely the result of several factors acting together. The most significant risk factor for multiple myeloma is age, as 96% of cases are diagnosed in people older than 45 years, and more than 63% are diagnosed in people older than 65 years.

Pertesi, M., Went, M., Hansson, M., Hemminki, K., Houlston, R.S. & Nilsson, B. 2020.
"Multiple myeloma (MM) is the second most common blood malignancy. Epidemiological family studies going back to the 1920s have provided evidence for familial aggregation, suggesting a subset of cases have an inherited genetic background. Recently, studies aimed at explaining this phenomenon have begun to provide direct evidence for genetic predisposition to MM. Genome-wide association studies have identified common risk alleles at 24 independent loci. Sequencing studies of familial cases and kindreds have begun to identify promising candidate genes where variants with strong effects on MM risk might reside. Finally, functional studies are starting to give insight into how identified risk alleles promote the development of MM. Here, we review recent findings in MM predisposition field, and highlight open questions and future directions."

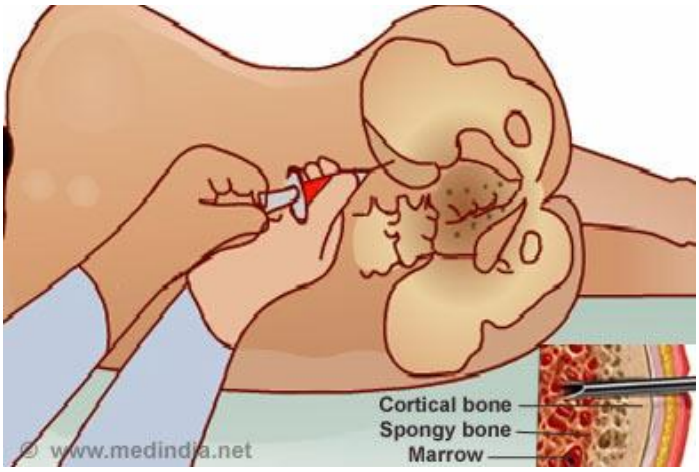
Diagnosis of Multiple Myeloma

The following tests may be done to diagnose multiple myeloma:

A blood test called serum protein electrophoresis separates the blood proteins and can detect the presence of monoclonal proteins (M proteins) — referred to as an "M spike" — in the blood.

Other tests may include:

- Imaging - X-rays of the skeleton can show whether the bones have any thinned-out areas (osteolytic lesions), common in multiple myeloma. If a closer view of the bones is necessary, the doctor may use magnetic resonance imaging (MRI), computerised tomography (CT) scanning or positron emission tomography (PET) scanning.
- Bone marrow examination - the doctor may also conduct a bone marrow examination (biopsy) by using a needle to remove a small sample of bone marrow tissue. The sample is then examined under a microscope to check for myeloma cells. A portion of the sample is also tested for chromosome abnormalities using tests such as fluorescence *in situ* hybridisation (FISH).



[Picture Credit: Bone Marrow Biopsy]

- Tests may also be done to measure the rate at which the plasma cells are dividing.

Rajkumar, S.V. 2020.
Disease overview: Multiple myeloma accounts for approximately 10% of hematologic malignancies.
Diagnosis: The diagnosis requires ≥10% clonal bone marrow plasma cells or a biopsy proven plasmacytoma plus evidence of one or more multiple myeloma defining events (MDE) namely CRAB (hypercalcemia, renal failure, anemia, or lytic bone lesions) features felt related to the plasma cell disorder, bone marrow clonal plasmacytosis ≥60%, serum involved/uninvolved free light chain (FLC) ratio ≥100 (provided involved FLC is ≥100 mg/L), or >1 focal lesion on magnetic resonance imaging (MRI).
Risk stratification: The presence of del(17p), t(4;14), t(14;16), t(14;20), gain 1q, or p53 mutation is considered high-risk multiple myeloma. Presence of any two high risk factors is considered double-hit myeloma; three or more high risk factors is triple-hit myeloma.
Risk-adapted initial therapy: In transplant eligible patients, induction therapy consists of bortezomib, lenalidomide, dexamethasone (VRd) given for approximately 3-4 cycles followed by autologous stem cell transplantation (ASCT). In high-risk patients, daratumumab, bortezomib, lenalidomide, dexamethasone (Dara-VRd) is an alternative to VRd. Selected standard risk patients can get additional cycles of induction, and delay transplant until first relapse. Patients not candidates for transplant are typically treated with VRd for approximately 8-12 cycles followed by lenalidomide; alternatively these patients can be treated with daratumumab, lenalidomide, dexamethasone (DRd).
Maintenance therapy: After ASCT, standard risk patients need lenalidomide maintenance, while bortezomib-based maintenance is needed for patients with high-risk myeloma.
Management of refractory disease: Most patients require a triplet regimen at relapse, with the choice of regimen varying with each successive relapse.

Gupta, N., Sharma, A. & Shrama, A. 2020.
"Multiple Myeloma (MM) is the second most common hematological malignancy after non-Hodgkin lymphoma and is manifested by uncontrolled proliferation and accumulation of abnormal plasma cells in the bone marrow (BM). The incidence along with deaths associated with MM is on rise due to lack of an effective diagnosis at an early stage. The identification of MM decades ago marks the

adoption of certain conventional markers such as plasma cell percentage in BM, serum protein electrophoresis for M-band and urinary Bence-Jones protein. This was then followed by utilization of β2 microglobulin and serum albumin for determining the staging of MM. The need for a better diagnostic or prognostic marker prompts researchers and hence, certain novel markers have been tested which includes extracellular matrix proteins, angiogenic factors, telomeres and telomerase along with the immune markers. Nowadays, proteomic and genomic studies are being performed to identify novel diagnostic and/or prognostic markers for MM. Followed by this, comes the emerging concept of liquid biopsy which allows easy and non-invasive detection of the disease. The liquid biopsy comprises of circulatory tumor cells along with the nucleic acids (microRNAs and cell-free DNA) released from the tumor cells in peripheral circulation which could be a true representation of BM. This review, hence, summarizes the emerging biomarkers involved in the diagnosis and prognosis of MM."

Staging of Multiple Myeloma

Staging is the process of finding out how much the cancer has advanced. It is important for treatment options and prognosis.

Treatment of Multiple Myeloma

Because currently there is no known cure for multiple myeloma, understanding the standard treatments - and the treatment options - is critical in attempting to prolong survival and maintain the patient's overall functional ability and quality of life. Aspects of importance in the treatment of multiple myeloma may include:

- Which patients with multiple myeloma are candidates for an approach known as 'watchful waiting', where the progress of the disease is monitored carefully but no specific treatment is required
- The various phases in the treatment of multiple myeloma for patients whose disease has progressed to the point where treatment becomes necessary. These treatment phases are grouped into the following categories:
  - initial or induction chemotherapy
  - consolidation therapy
  - maintenance therapy
  - salvage therapy
- The role of stem cell transplantation in the management of patients with multiple myeloma, including the risks and benefits of this procedure
- The treatment options available to patients with multiple myeloma who experience a relapse or recurrence of the disease after initially having gone into remission
- The role of plasmapheresis - the direct removal of abnormal antibody proteins from the bloodstream - in the management of patients with multiple myeloma
- A detailed overview of the risk of infections in people with multiple myeloma, including practical recommendations for reducing the risks of developing potentially life-threatening bacterial, viral, and fungal infections
- The treatment options that are available for the management of patients with multiple myeloma who develop myeloma bone disease - areas of bone destruction caused by multiple myeloma that significantly increase the risk of developing pathologic fractures
- The prognosis (outlook) for people with multiple myeloma and important prognostic factors that have a significant impact in predicting the overall chances of recovery and survival

- The role of complementary therapies in the management of people with multiple myeloma
- Quality of life issues such as sleep disorders, fatigue, weight loss, and psychological stress that often confront people with multiple myeloma and tips for how to minimize their impact and better cope with these important issues

If one has multiple myeloma and is not experiencing any symptoms, he/she may not need treatment. However, the doctor will regularly monitor the patient's condition for signs the disease is progressing. If it is, the patient may need treatment. If one is experiencing symptoms, treatment can help relieve pain, control complications of the disease, stabilise the condition and slow the progress of the disease.

Treatments for Multiple Myeloma may Include:
Though there's no cure for multiple myeloma, with good treatment results one can usually return to near-normal activity.

Chemotherapy. Chemotherapy may be given orally or given through an intravenous (IV) injection. Chemotherapy is often given in cycles over a period of months, followed by a rest period.

Minnie, S.A. & Hill, G.R. 2020.
"Multiple myeloma (MM), a bone marrow-resident hematological malignancy of plasma cells, has remained largely incurable despite dramatic improvements in patient outcomes in the era of myeloma-targeted and immunomodulatory agents. It has recently become clear that T cells from MM patients are able to recognize and eliminate myeloma, although this is subverted in the majority of patients who eventually succumb to progressive disease. T cell exhaustion and a suppressive bone marrow microenvironment have been implicated in disease progression, and once these are established, immunotherapy appears largely ineffective. Autologous stem cell transplantation (ASCT) is a standard of care in eligible patients and results in immune effects beyond cytoreduction, including lymphodepletion, T cell priming via immunogenic cell death, and inflammation; all occur within the context of a disrupted bone marrow microenvironment. Recent studies suggest that ASCT reestablishes immune equilibrium and thus represents a logical platform in which to intervene to prevent immune escape. New immunotherapies based on checkpoint inhibition targeting the immune receptor TIGIT and the deletion of suppressive myeloid populations appear attractive, particularly after ASCT. Finally, the immunologically favorable environment created after ASCT may also represent an opportunity for approaches utilizing bispecific antibodies or chimeric antigen receptor T cells."

Shah, U.A. & Mailankody, S. 2020.
"Despite considerable advances in treatment approaches in the past two decades, multiple myeloma remains an incurable disease. Treatments for myeloma continue to evolve with many emerging immunotherapies. The first immunotherapy used to treat hematologic cancers, including multiple myeloma, was an allogeneic stem cell transplant. In the mid-2000s, immunomodulatory drugs thalidomide, lenalidomide, and subsequently pomalidomide were proven to be effective in multiple myeloma and substantially improved survival. The next wave of immunotherapies for multiple myeloma included the monoclonal antibodies daratumumab and elotuzumab, which were approved by the Food and Drug Administration in 2015. Subsequently, a variety of immunotherapies have been developed for multiple myeloma, including chimeric antigen receptor T cells, bispecific antibodies, antibody drug conjugates, and checkpoint inhibitors. Many of these emerging treatments

target the B cell maturation antigen, which is expressed on plasma cells, although several other novel receptors are also being studied. This review summarizes the evidence of these various immunotherapies, their mechanism of action, and data from clinical trials regarding the treatments' safety and efficacy."

Corticosteroids. Corticosteroids, such as prednisone and dexamethasone, have been used for decades to treat multiple myeloma. They are typically given in pill form.

Stem cell transplantation. This treatment involves using high-dose chemotherapy along with transfusion of previously collected immature blood cells (stem cells) to replace diseased or damaged marrow.

Stadtmauer, E.A., Pasquini, M.C., Blackwell, B., Hari, P., Bashey, A., Devine, S., Efebera, Y., Ganguly, S., Gasparetto, C., Geller, N., Horowitz, M.M., Koreth, J., Knust, K., Landau, H., Brunstein, C., McCarthy, P., Nelson, C., Qazilbash, M.H., Shah, N., Vesole, D.H., Vij, R., Vogl, D.T., Giralt, S., Somlo, G. & Krishnan, A. 2019.
PURPOSE: Single-cycle melphalan 200 mg/m^2 and autologous hematopoietic cell transplantation (AHCT) followed by lenalidomide (len) maintenance have improved progression-free survival (PFS) and overall survival (OS) for transplantation-eligible patients with multiple myeloma (MM). We designed a prospective, randomized, phase III study to test additional interventions to improve PFS by comparing AHCT, tandem AHCT (AHCT/AHCT), and AHCT and four subsequent cycles of len, bortezomib, and dexamethasone (RVD; AHCT + RVD), all followed by len until disease progression.
PATIENTS AND METHODS: Patients with symptomatic MM within 12 months from starting therapy and without progression who were age 70 years or younger were randomly assigned to AHCT/AHCT + len (n = 247), AHCT + RVD + len (n = 254), or AHCT + len (n = 257). The primary end point was 38-month PFS.
RESULTS: The study population had a median age of 56 years (range, 20 to 70 years); 24% of patients had high-risk MM, 73% had a triple-drug regimen as initial therapy, and 18% were in complete response at enrollment. The 38-month PFS rate was 58.5% (95% CI, 51.7% to 64.6%) for AHCT/AHCT + len, 57.8% (95% CI, 51.4% to 63.7%) for AHCT + RVD + len, and 53.9% (95% CI, 47.4% to 60%) for AHCT + len. For AHCT/AHCT + len, AHCT + RVD + len, and AHCT + len, the OS rates were 81.8% (95% CI, 76.2% to 86.2%), 85.4% (95% CI, 80.4% to 89.3%), and 83.7% (95% CI, 78.4% to 87.8%), respectively, and the complete response rates at 1 year were 50.5% (n = 192), 58.4% (n = 209), and 47.1% (n = 208), respectively. Toxicity profiles and development of second primary malignancies were similar across treatment arms.
CONCLUSION: Second AHCT or RVD consolidation as post-AHCT interventions for the up-front treatment of transplantation-eligible patients with MM did not improve PFS or OS. Single AHCT and len should remain as the standard approach for this population.

Radiation therapy. This treatment uses high-energy penetrating waves to damage myeloma cells and stop their growth.

Treatments for relapsed or treatment-resistant multiple myeloma

Most people who are treated for multiple myeloma eventually experience a relapse of the disease. In some cases, none of the currently available, first line therapies slow the cancer cells from

multiplying. If the patient experiencea a relapse of multiple myeloma, the doctor may recommend repeating another course of the treatment that initially helped. Another option is trying one or more of the other treatments typically used as first line therapy, either alone or in combination.

Lonial, S., Lee, H.C., Badros, A., Trudel, S., Nooka, A.K., Chari, A., Abdallah, A.O., Callander, N., Lendvai, N., Sborov, D., Suvannasankha, A., Weisel, K., Karlin, L., Libby, E., Arnulf, B., Facon, T., Hulin, C., Kortüm, K.M., Rodríguez-Otero, P., Usmani, S.Z., Hari, P., Baz, R., Quach, H., Moreau, P., Voorhees, P.M., Gupta, I., Hoos, A., Zhi, E., Baron, J., Piontek, T., Lewis, E., Jewell, R.C., Dettman, E.J., Popat, R., Esposti, S.D., Opalinska, J., Richardson, P. & Cohen, A.D. 2020.

Background: Belantamab mafodotin (GSK2857916), an immunoconjugate targeting B-cell maturation antigen, showed single-agent activity in the phase 1 DREAMM-1 study in heavily pre-treated patients with relapsed or refractory multiple myeloma. We further investigated the safety and activity of belantamab mafodotin in the DREAMM-2 study.

Methods: DREAMM-2 is an open-label, two-arm, phase 2 study done at 58 multiple myeloma specialty centres in eight countries. Patients (aged ≥18 years) with relapsed or refractory multiple myeloma with disease progression after three or more lines of therapy and who were refractory to immunomodulatory drugs and proteasome inhibitors, and refractory or intolerant (or both) to an anti-CD38 monoclonal antibody with an Eastern Cooperative Oncology Group performance status of 0-2 were recruited, centrally randomly assigned (1:1) with permuted blocks (block size 4), and stratified by previous lines of therapy (≤4 vs >4) and cytogenetic features to receive 2·5 mg/kg or 3·4 mg/kg belantamab mafodotin via intravenous infusion every 3 weeks on day 1 of each cycle until disease progression or unacceptable toxicity. The intention-to-treat population comprised all randomised patients, regardless of treatment administration. The safety population comprised all patients who received at least one dose of belantamab mafodotin. The primary outcome was the proportion of randomly assigned patients in the intention-to-treat population who achieved an overall response, as assessed by an independent review committee. This study is registered with ClinicalTrials.gov, NCT03525678, and is ongoing.

Findings: Between June 18, 2018, and Jan 2, 2019, 293 patients were screened and 196 were included in the intention-to-treat population (97 in the 2·5 mg/kg cohort and 99 in the 3·4 mg/kg cohort). As of June 21, 2019 (the primary analysis data cutoff date), 30 (31%; 97·5% CI 20·8-42·6) of 97 patients in the 2·5 mg/kg cohort and 34 (34%; 23·9-46·0) of 99 patients in the 3·4 mg/kg cohort achieved an overall response. The most common grade 3-4 adverse events in the safety population were keratopathy (in 26 [27%] of 95 patients in the 2·5 mg/kg cohort and 21 [21%] of 99 patients in the 3·4 mg/kg cohort), thrombocytopenia (19 [20%] and 33 [33%]), and anaemia (19 [20%] and 25 [25%]); 38 (40%) of 95 patients in the 2·5 mg/kg cohort and 47 (47%) of 99 in the 3·4 mg/kg cohort reported serious adverse events. Two deaths were potentially treatment related (one case of sepsis in the 2·5 mg/kg cohort and one case of haemophagocytic lymphohistiocytosis in the 3·4 mg/kg cohort).

Interpretation: Single-agent belantamab mafodotin shows anti-myeloma activity with a manageable safety profile in patients with relapsed or refractory multiple myeloma.

Funding: GlaxoSmithKline.

Antibody therapy:

Treating Multiple Myeloma by means of antibody therapy:

Ntanasis-Stathopoulos, I., Gavriatopoulou, M. & Terpos, E. 2020.

Introduction: Multiple myeloma (MM) is characterized by the uncontrollable proliferation of plasma cells and the excessive production of a specific type of immunoglobulin. Immune system is

deregulated in MM and, thus, immunotherapy is a promising therapeutic strategy.**Areas covered**: The first approach is to use monoclonal antibodies that recognize specific antigens on the surface of myeloma cells, such as CD38 and B-cell maturation antigen. Upon binding to their target, monoclonal antibodies activate the immune cells to destroy the malignant cell. Anti-CD38 molecules as part of highly effective combination regimens have been approved in both newly diagnosed and relapsed/refractory patients and have significantly changed the myeloma treatment landscape in the recent years. Another strategy is to use antibodies that bind both to a molecule on the surface of the myeloma cell and another molecule on the surface of a T-cell (bispecific antibodies). Consecutively, the T-cell comes close to and recognizes the myeloma cell. These have shown promising results in heavily pre-treated patients.**Expert opinion**: Antibody therapy has significantly enhanced the armamentarium against MM. Further research should focus on tailoring the combination regimens based on disease and patient characteristics in order to optimize the efficacy and safety.

Treating Complications of Multiple Myeloma

Because multiple myeloma can cause a number of complications, one may also need treatment for those specific conditions.

About Clinical Trials

Clinical trials are research studies that involve people. They are conducted under controlled conditions. Only about 10% of all drugs started in human clinical trials become an approved drug.

Clinical trials include:

- Trials to test effectiveness of new treatments
- Trials to test new ways of using current treatments
- Tests new interventions that may lower the risk of developing certain types of cancers
- Tests to find new ways of screening for cancer

The South African National Clinical Trials Register provides the public with updated information on clinical trials on human participants being conducted in South Africa. The Register provides information on the purpose of the clinical trial; who can participate, where the trial is located, and contact details.

For additional information, please visit: www.sanctr.gov.za/

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Bone Marrow Biopsy
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Ms Stacy Erholtz
https://www.google.co.za/search?q=Ms+Stacy+Erholtz&source=lnms&tbm=isch&sa=X&ei=S7eaU9X5HK-v7Aba5YH4Bg&ved=0CAYQ_AUoAQ&biw=1517&bih=714&dpr=0.9#facrc=_&imgdii=_&imgrc=4df2T2uKhj37LM%253A%3BgXM8ecwVmZ7pgM%3Bhttp%253A%252F%252Fi2.cdn.turner.com%252Fcnn%252Fdam%252Fassets%252F140518151715-newsroom-intv-stacy-erholtz-cancer-survivor-00010306-story-top.jpg%3Bhttp%253A%252F%252Fwww.cnn.com%252F2014%252F05%252F15%252Fhealth%252Fmeasles-cancer-remission%252F%3B640%3B360

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