Review Article

The American Journal of Kidney Diseases

The incidence and treatment of kidney disease caused by multiple myeloma in China.

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Received Date : June 27, 2024
Accepted Date : June 29, 2024
Published Date : July 29, 2024

ABSTRACT

History: One type of clonal B-cell malignancy of the bone marrow is called multiple myeloma (MM). One common MM consequence is renal dysfunction. A systematic review of kidney illness caused by MM does not yet exist in China. **Synopsis:** In China, there are 0.6 cases of MM per 100,000 people. Among all MM patients, renal insufficiency was seen in 24, 19.7, and 30.8%. [In Taiwan, Hong Kong, and the Chinese mainland, respectively, defined by serum creatinine (Scr) ≥ 2 mg/dl] at diagnosis. It is advised to use novel criteria for evaluating renal function in patients with MM who have stabilized Scr, which are based on estimated glomerular filtration rate findings.According to reports, 30.5% of MM patients had a creatinine clearance rate (Ccr) of less than 30 ml/min, while 78% of patients had a Ccr of less than 90 ml/min.

In patients with MM, the IgG type was the most common; individuals with the light-chain and IgD types typically had greater rates of renal more harm than others. Clinical practice has seen the introduction of novel, more potent medications, blood purification techniques, and peripheral blood autologous stem cell transplantation. Regretfully, research done on patients.with renal insufficiency were nearly all retrospective, had a small number of participants, and had a brief duration of follow-up. While bortezomib is a novel medication that is used more frequently than Due of financial limitations, conventional chemotherapy is still utilized as before. The RIFLE criteria have received widespread validation across the globe, however they are infrequently applied to patients with MM. These criteria appear suitable for defining the severity of acute kidney damage (AKI). This was the first time our team had retrospectively analyzed the natural history of MM patients with AKI using the RIFLE approach. A somewhat improved long-term prognosis was linked to the severity of AKI as determined by the RIFLE criteria (OR = 2.04, p = 0.06).

Principal Takeaways: When treating MM, new standards for renal insufficiency should be implemented. Recently, there has been a significant improvement in the care of MM patients with kidney illness. More extensive randomized controlled trials must be carried out.

regarding the long-term result in China. Facts from the East and the West: (1) Cohort studies conducted in Japan, Europe, China, and Korea have indicated that 16, 21, 24, and 33% of patients with MM had a Scr level greater than 2 mg/dl. In both Chinese and Western patients, 30 and 15% of cases, respectively, had a Ccr <30 ml/min.ern MM cohorts, in turn. Myeloma cast nephropathy is the most common cause of severe renal impairment (RI) in patients with multiple myeloma (MM). (2) Most studies evaluating the effectiveness of new medications (bortezomib, carfilzomib, thalidomide, and lenalidomide) have been conducted on individuals in the West. Currently, dexamethasone and boretimib are the mainstay of therapy for In the West, MM and severe RI. Autologous stem cell transplantation is not contraindicated in cases of severe RI (ASCT). The majority of the data originate from the West, yet there are case studies from China that highlight successful ASCT outcomes.

Research on high cutoff hemodialysis's ability to remove free light chain is being conducted in the West through randomized controlled trials (RCTs). Research in China has not yet performed research in this area. Positive results are being reported from the increased usage of new medications like bortezomib in China; however, RCT studies are still required to confirm the safety and efficacy of this and other innovative treatments.Moreover, among all hematologic malignancies, MM is ranked third in China, behind leukemia and non-Hodgkin's lymphoma [2, 3].

Renal function impairment affects 15–40% of all MM patients. Variations in the definition of renal damage led to wide variations in the assessments in these investigations [4–11]. Serum creatinine (Scr) levels were above normal in about 30–40% of the MM patients at the time of diagnosis. According to the Asia Myeloma Network, which included 3,405 MM patients, renal function impairment (defined by Scr >2 mg/dl) was present in 23.4% of MM patients at diagnosis.

The percentages in this survey are as follows: 24% in the

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Chinese mainland, 19.7% in Hong Kong, 30.8% in Taiwan, 16.1% in Japan (the lowest), and 33.5% in Korea (the highest) [12]. As per the findings of Zhao et al. [13], 78% of the 30.5% of MM patients had a creatinine clearance rate (Ccr) of less than 30 ml/min, while 90 ml/min was the threshold for Ccr. In patients with end-stage renal illness from the USA, the incidence of MM is 1.0%, while the prevalence rate in 0.3 percent of the same population [14]. According to ERAEDTA data, the incidence of end-stage renal disease associated with multiple sclerosis rose from 0.7 pmp in 1986–1990 to 2.52 pmp in 2001–2005 [15]. For China, we do not have any pertinent statistics, though.

Keywords: Bortezomib · China · Diagnosis · Multiple myeloma · Renal impairment

INTRODUCTION

A clonal B-cell cancer of the bone marrow, multiple myeloma (MM) can present with a range of clinical symptoms, such as anemia, renal impairment, infection and bone disease. The primary cause of renal failure in multiple myeloma (MM) patients is myeloma cast nephropathy, which is brought on by the precipitation of monoclonal light chain (LC) with the Tamm-Horsfall protein form casts that obstruct renal distal tubule lumens. Apart from myeloma cast nephropathy, other glomerulopathies are linked to multiple sclerosis (MM), such as monoclonal immunoglobulin deposition disease (MIDD) and LC amyloidosis (AL). Chronic renal failure and nephrotic syndrome were more common in these patients. The hallmark of AL is deposits of LC (mostly lambda LC) that are Congo-red-positive and consist of nonbranched fibrils with an exterior diameter of 10–12 nm.

MIDD is found in the tubular, glomerular, and vascular basement membranes as amorphous granular monoclonal immunoglobulin deposits.

either in electron microscopy or immunofluorescence.

MIDD encompasses heavy-chain deposition disease, light- and heavy-chain deposition disease, predominantly deposits of kappa LC, and LC deposition disease (LCDD).

MM is the second most common hematological malignancy and makes up 1% of all malignancies.

The median age at diagnosis for multiple myeloma (MM) is 70 years old, with an estimated 120,000 cases occurring annually worldwide [1]. China has 0.6/100,000 cases of MM, a significantly lower frequency than 12.7/100,000 cases in Africa. Furthermore, among all hematologic malignancies, MM is ranked third in China, behind non-Hodgkin's lymphoma and leukemia [2, 3]. Renal function impairment affects between 15 and 40 percent of all MM patients. There were discrepancies in the definition of renal damage in these investigations, which led to a wide range in assessment [4–11]. At the time of diagnosis, the serum creatinine (Scr) levels of about 30–40% of the MM patients were higher than normal. According to data from the Asia Myeloma Network, which included 3,405 MM patients, 23.4% of MM patients had renal function impairment upon diagnosis (classified as Scr >2 mg/dl). This number is 24% in the Chinese mainland, 19.7% in Hong Kong, 30.8% in Taiwan, 16.1% in Japan (the lowest), and 33.5% in Korea (the highest) according to this study [12]. According to Zhao et al. [13], 30.5% and 78% of the MM patients, respectively, had creatinine clearance rates (Ccr) of less than 30 ml/min and less than 90 ml/min.

In the United States, patients with end-stage renal illness have an incidence of 1.0% and a prevalence rate of 0.3% of MM [14]. According to ERAEDTA data, the incidence of end-stage renal disease associated with multiple sclerosis rose from 0.7 pmp in 1986–1990 to 2.52 pmp in 2001–2005 [15]. For China, we do not have any pertinent statistics, though.

CLINICAL CHARACTERISTICS AND DIAGNOSIS

While renal AL or LCDD are uncommon, renal tubular damage and renal failure are the most common presentations in patients with IgG and IgA MM-induced kidney diseases. Remarkably, compared to other patients, those with LC and IgD MM typically have a higher incidence of renal injury. Other than injury to the tubules, A prevalent condition that eventually results in renal AL or LCDD and manifests as nephritic syndrome is glomerular damage. Of all LC MM patients, renal failure affects over 50%.

Over 90% of IgD MM patients experience renal failure, despite the disease having a 1% prevalence. Based on the research conducted by Kim and colleagues.Of all Asian heavy-chain type MM patients, patients with IgG, IgA, IgD, LC, and nonsecretory MM made up 55.2, 22, 3.1, 17.9, and 1.9%.

correspondingly. According to Chow et al. [16], renal insufficiency was present in 22.2% of MM patients in Hong Kong at the time of diagnosis; the LC type was most common in this situation. Of the 211 MM patients in our kidney department, 40.8% had IgG MM, 20.9% had IgA MM, 7.6% had IgD MM, and 20.9% had LC MM. The percentages of renal insufficiency were 62.8, 59, 75, and 86.4%, in that order. The ratios for nephrotic syndrome were 10.5, 15.9, 18.8, and 9.1%, in that order. Renal biopsy was done on 61 patients (28.9%); 26 patients

Treatment: Over 50% of MM patients who get effective treatment see improvements in their renal function and a decrease in plasma LC concentration. The purpose of MM treatment is to obtain longer period of progression-free survival and more thorough remission. Chemotherapy regimens for multiple myeloma have evolved significantly in the last ten years. The prognosis is improved and the remission rate is greatly increased by the use of new

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medications (such bortezomib) and peripheral blood autologous stem cell transplantation (ASCT). Traditionally, vincristine plus doxorubicin plus dexamethasone, high-dose dexamethasone, and melphalan and prednisone were used as chemotherapeutic treatments for multiple myeloma. These treatments were still in use in China due to financial constraints.The first-in-class proteasome inhibitor to be licensed for the treatment of multiple myeloma is called boratezomib. Bortezomib has a higher treatment efficiency than conventional chemotherapy. Bortezomib has been suggested by the NCCN (National Comprehensive Cancer Network). For primary and refractory MM, monotherapy or combination therapy is used. Even in patients receiving dialysis, boratezomib is thought to be safe and beneficial in the treatment of multiple sclerosis patients with renal injury of any severity [25]. It has been confirmed that bortezomib has an effect in several phase III investigations.

GFR rates of ≤30, 31–50, and >50 ml/min were observed in 6, 27, and 67% of MM patients receiving VMP (bortezomib, melphalan, and prednisone; n = 344) in the VISTA study.The complete response (CR) was 37, 29, and 30%, corresponding to an efficiency rate of 74, 67, and 72%; 44% of the patients their renal function was restored [26]. Regretfully, the only research done in China has been retrospective, using small sample sizes and brief follow-up periods. In a prospective trial, Li et al. [27] reported on 18 newly diagnosed MM patients with renal impairment (Scr >2 mg/dl), or a mean creatinine level of 5.3 mg/dl. Patients were given.

CONCLUSION

For patients with MM, kidney damage is the most frequent consequence. The course of therapy has advanced significantly in recent years. In patients with renal failure, bosentasomib is currently considered the first-line treatment because to its significantly increased efficacy, extended survival duration, and lack of need for dose modification. It is used more frequently. in China and has positive outcomes, even with the comparatively high price of bortezomib. In patients with multiple myeloma who also have renal failure, we currently lack expertise with ASCT. Hemodialysis has the potential to enhance prognosis, particularly high cutoff hemodialysis. There is new hope for the treatment of MM patients with renal failure when new medication chemotherapy is paired with delayed high cutoff extended hemodialysis; more research is definitely required.

Conflict of Interest Statement: We certify that we have no personal or financial ties to any individuals or groups that might have improperly impacted our work.

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