



# the medical Review

## Chronic Renal Failure

Chronic Renal Failure is found in patients of all ages. Patients with diabetes and hypertension have the highest risk of developing kidney disease although increased age is an independent risk factor. Other diseases also cause renal failure, particularly in younger patients, causing a dramatic increase in dialysis or transplantation. The kidney is made up of over 1 million nephrons, each of which contributes to the glomerular filtration rate (GFR). This filtration allows the kidneys to clear toxins and normal plasma solutes. It is a measure of how well the kidney is functioning. Renal failure is divided into five stages which correspond with a worsening GFR. These five stages are listed in the sidebar to the left. Once the GFR has decreased to less than 50% of normal, a patient's blood urea nitrogen (BUN) and creatinine begin to rise.

Dialysis costs have continued to escalate in recent years. Average costs for dialysis in 2005 were approximately \$7,000-\$10,000/month. In 2007, the average costs for dialysis range from \$20,000-\$40,000/month. The largest single contributor to the high dialysis costs are the inflated charges of erythropoietin (Procrit, Epogen). The current average wholesale price for 10,000 units of Epogen or Procrit is approximately \$150 with most patients requiring this amount each time it is given. Reasonable charges for 10,000 units Procrit are under \$500 but that is not what is charged in the market resulting in huge drug costs for these patients. It is important to review the medical necessity of the amount given AND the charges billed for the erythropoietin. Transplantation is a much better clinical option. Average first year costs for kidney transplants are \$225,000, but ongoing costs after uncomplicated transplant are nominal.

### RENAL FAILURE

#### STAGE 1:

Kidney damage with normal or increased GFR (>90 mL/min/1.73 m<sup>2</sup>)

#### STAGE 2:

Mild reduction in GFR (60-89 mL/min/1.73 m<sup>2</sup>)

#### STAGE 3:

Moderate reduction in GFR (30-59 mL/min/1.73 m<sup>2</sup>)

#### STAGE 4:

Severe reduction in GFR (15-29 mL/min/1.73 m<sup>2</sup>)

#### STAGE 5:

Kidney failure (GFR <15 mL/min/1.73 m<sup>2</sup> or dialysis)

## Treatment of Childhood Acute Lymphoblastic Leukemia (ALL)

ALL is the most common cancer diagnosed in children and represents 23% of cancer diagnoses among children younger than 15 years. Most are diagnosed prior to age three. The primary accepted nongenetic risk factors for ALL are prenatal exposure to x-rays and postnatal exposure to high doses of radiation. Among children with ALL, more than 95% attain remission and 75% to 85% survive free of leukemia recurrence at least 5 years from diagnosis. Successful treatments incorporate combination chemotherapy and specific central nervous system (CNS) preventive therapy utilizing intrathecal chemotherapy with or without cranial radiation.

For untreated ALL, therapy consists of induction chemotherapy and CNS therapy which varies depend-

ing on whether there is evidence of CNS disease at diagnosis. For induction, patients usually receive three-drug therapy using vincristine, prednisone/dexamethasone and L-asparaginase although some receive four or even five drug regimens. Patients without CNS disease usually receive intrathecal therapy starting at induction, continuing through both consolidation and maintenance therapy. If CNS disease is present, radiation is always added to this regimen. Once remission is achieved, consolidation chemotherapy is given and then patients receive maintenance treatment for approximately 2-3 years. Maintenance therapy consists of daily oral mercaptopurine and weekly oral methotrexate along with pulses of vincristine and steroids. Children who relapse should be considered for allogeneic stem cell transplants.

Healthcare payment errors totaled over \$120 billion in 2005

THE BOTTOM LINE



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Patients who experience an  
adverse drug reaction in a hospital  
admission have 33% higher inpatient  
costs overall.

## Spotlight on: Erbitux (Cetuximab) in Metastatic Colorectal Cancer Treatment

The treatment options for metastatic colorectal cancer have widely expanded over the past few years. Patients are living longer with the disease and chemotherapy is now routinely given in these patients for more than two years. If patients are able to tolerate the drug regimen and there is evidence of tumor response, chemotherapy can be given for even longer. A newer drug in the arsenal is Erbitux. Erbitux is indicated for the treatment of metastatic colorectal cancer whose tumor expresses a protein called an Epidermal Growth Factor Receptor (EGFR).

Erbitux is FDA approved for metastatic colorectal cancer in two regimens. It is given in combination with another chemotherapy drug, Camptosar (irinotecan), for patients whose tumor growth has progressed after receiving chemotherapy with Camptosar. It can also be given as a single agent for patients who are unable to tolerate che-

motherapy with Camptosar. Erbitux preferentially binds to cells that express EGFR. All cells, both normal and cancerous, have various receptors that are on their surface. Erbitux binds to the EGFR on both normal and malignant cells blocking the receptor from binding to signaling agents that would otherwise cause the cell to grow and divide. When this happens to cancer cells, these cells may stop growing and dividing allowing the tumor to shrink. It can cause problems when the Erbitux prevents normal cell growth and division. This is what leads to adverse drug reactions when it is given.

The recommended dose of Erbitux is 400 mg/m<sup>2</sup> as an initial loading dose (first infusion) administered intravenously over 120 minutes. The recommended weekly maintenance dose is 250 mg/m<sup>2</sup> infused over 60 minutes. Erbitux is sold in 100 mg vials with an average wholesale price of approximately \$575/vial.

## Therapies for Chronic Lymphedema

Lymphedema is a failure of the lymphatic transport system resulting in the accumulation of lymphatic and edema fluid in the soft tissue. Compression of the lymphatic system is the most common cause of this, particularly in cases of malignancy. Treatment for lymphedema is very difficult and there usually is no cure.

The first line treatment is conservative therapy to eliminate stagnation and restore normal lymphatic circulation. This should begin as soon as possible. The majority of patients can be treated with conservative

measures although compliance is an issue as the treatment is cumbersome and inconvenient. Compression stockings are given to patients. These should be worn continuously during the day. They may be removed at night when the extremity is elevated in bed, but they should be replaced every morning. They should also have graduated compression, increasing from distal to proximal, on the affected extremity. Weight loss and elevation also are encouraged.

Manual compression for lymphatic drainage is another conservative measure for patients. This can be accom-

plished by the bandaging or via intermittent pneumatic pump compression therapy. These devices provide sequential active compression from distal to proximal, essentially "milking" the lymph from the extremity.

The goal of treatment is to reduce the lymphedema thereby alleviating pain, improving redness and facilitating better ambulation. Surgical measures are required in extreme cases for patients who do not improve with conservative treatment or in cases where the extremity is so large that it impedes activities of daily living.

