Paraproteinaemia

Paraproteinemia is a finding of a **high concentration of monoclonal immunoglobulin or immunoglobulin fragment**, so called **paraprotein** or serum **M component** (M for monoclonal) produced in any one of a diverse group of immunoproliferative disorders involving the proliferation of a single clone of cells. Alternativelly the group of (generally malignant) disorders causing paraproteinemia.

Based on the type of the plasma cells, either whole immunoglobulins of IgG or IgM class are produced or just light or heavy chains are synthesised. The presence of paraproteins manifests itself in serum electrophoresis as a narrow and high peak in the band of γ-globulins. If only light chains are synthesized, it is called *Bence-Jones protein*. Bence-Jones protein is filtered into urine, but the dipstick method for proteinuria is not sensitive to it. Electrophoresis of urine or denaturation of the protein by heating it up is necessary to pick them up. Bence-Jones protein can cause a damage to the renal tubuli. Protein casts may form in distal tubuli and cause a nephropathy, while crystals may accumulate in the cytoplasm of proximal tubular cells (typically in MGUS – see lower), causing Fanconi syndrome.

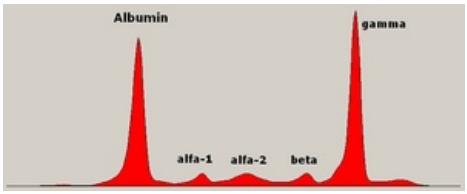
The concentration of paraprotein in blood reflects the size of the pathological clone of plasma cells. A substantial increase in concentration can cause a so called **hyperviscosity syndrome** (retinopathy and other sight disorders, thrombosis, neurological manifestations). If the M component is composed of cryoglobulins, a specific disorder of microcirculation, so called Raynauld syndrome appears (cryoglobulins precipitate in colder acral parts of the body). The synthesis of paraprotein is also accompanied by reduction of synthesis of normal (other) immunoglobulins and by their increased degradation. Consequently, there is low immunity against infections.

The presence of paraprotein is characteristic of following **lymphoproliferative disease**: Multiple myeloma (plasmocytoma), primary amyloidosis, Waldenström's macroglobulinemia, heavy chain disease and MGUS (Monoclonal gammopathy of undetermined significance).

It may be found in Non malignant conditions too like: Non-Malignant - Auto-immune diseases: SLE, RA , Hashimoto’s thyroiditis ; Cutaneous diseases like Pyoderma gangrenosum ; Liver diseases like Cirrhosis , Hepatitis ; Infectious diseases: Mycobacterium and Bacterial endocarditis.

Multiple Myeloma (Plasmocytoma)

Progresive damage to skeleton caused by diffuse neoplastic proliferation of plasma cells. There is an increased production of IgG or IgA, Bence-Jones protein (light chains), IgM. Liver, spleen nor lymph nodes are not enlarged. Bone tissue is excessively resorbed by osteoclasts, leading to fast development of osteoporosis, destructive and osteolytic changes of axial skeleton and pathological fractures. Hypercalcemia, damage to renal tubular function (glycosuria, aminoaciduria…). Normocytic and normochromic anemia.



Typical plasma protein electrophoresis in multiple myeloma (elevated gamma).

Waldenström's Macroglobulinemia

Significant increase of IgM (no proteinuria) caused by neoplastic proliferation of plasma cells in bone marrow, spleen, liver and lymph nodes. Hepatomegaly, splenomegaly, lymphadenopathy. Bone metabolism is not affected. Possibly presence of cryoglobulins and Raynauld's syndrome, anemia, haemorrhagic diathesis.

Primary Amyloidosis

Develops on the basis of multiple myeloma. Fibrils of amyloid are composed of parts of light chains or whole light chains or parts of heavy chains. Symptom are non-specific (tiredness, loss of weight, syncopes…).

Heavy Chain Disease

Pathological production of parts of immunoglobulin heavy chains that are present in plasma as well as in urine. There are three types of the disease (based on three types of heavy chains): γ,α,μ. It can accompany lymphoma or other lymphoproliferative disease.

MGUS

is monoclonal gammopathy of undetermined significance**: Expansion of one clone of plasma cells (producing mostly IgG or IgA), which, however, does not display malignant behaviour for unknown reasons. Relatively common, treatable.**

Links

Related articles

- Dysproteinaemia

External links

- Fanconi syndrome (http://en.wikipedia.org/wiki/Fanconi_Syndrome)
- Raynauld syndrome (http://en.wikipedia.org/wiki/Raynauld_syndrome)