

# Clinical and Physiological Implications of Splenectomy in Modern Medical Practice

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## DESCRIPTION

Splenectomy refers to the surgical removal of the spleen, an organ located in the upper left region of the abdomen that performs several important physiological functions. Although humans can survive without a spleen, its removal leads to notable changes in immune regulation, blood cell management, and overall systemic balance. The procedure may be performed as an emergency or as a planned intervention depending on the underlying condition. Understanding the consequences of splenectomy requires an appreciation of the spleen's normal roles and the body's adaptive responses following its removal.

The spleen acts as a filter for circulating blood, removing aged or damaged blood cells and participating in immune surveillance. It contains specialized regions that support interactions between immune cells and blood-borne antigens. Through these interactions, the spleen assists in mounting defenses against certain bacterial infections, particularly those caused by encapsulated organisms. In addition, the spleen serves as a reservoir for platelets and contributes to iron recycling from degraded red blood cells. When splenic tissue is removed, these functions must be compensated for by other organs, primarily the liver and bone marrow.

Indications for splenectomy vary widely and include traumatic injury, hematological disorders, cystic lesions, and certain malignancies. In trauma cases, splenectomy may be required when bleeding cannot be controlled and poses an immediate threat to life. In non-traumatic settings, conditions such as immune-mediated platelet destruction or hereditary red blood cell disorders may necessitate removal to reduce excessive cell breakdown. Advances in imaging and surgical techniques have allowed more selective approaches, but splenectomy remains an essential option in many clinical scenarios.

The physiological changes following splenectomy are significant. One of the most notable effects is an increased susceptibility to infections. Without the spleen's filtering capacity, certain bacteria can proliferate rapidly in the bloodstream. This risk persists throughout life and requires long-term preventive

strategies. Vaccination against specific pathogens is strongly recommended both before and after the procedure. In some cases, prophylactic antibiotics may also be prescribed, particularly in children or individuals with additional risk factors.

Hematological alterations are commonly observed after splenectomy. Platelet counts often rise due to the loss of splenic sequestration, which can increase the likelihood of thrombotic events if not carefully monitored. Changes in red blood cell morphology may also be seen, as abnormal cells that would normally be removed by the spleen remain in circulation. These findings highlight the spleen's role in maintaining blood quality and demonstrate how its absence alters normal hematological regulation.

The body exhibits a degree of adaptive capacity following splenectomy. Over time, other organs partially assume the spleen's functions. The liver becomes more involved in filtering blood and clearing damaged cells, while lymphoid tissues contribute to immune activity. Despite these compensations, they do not fully replicate splenic function, making patient education and preventive care essential components of post-splenectomy management.

Surgical approaches to splenectomy have evolved considerably. Traditional open surgery has largely been supplemented by minimally invasive techniques, which are associated with reduced recovery time and fewer complications. Laparoscopic splenectomy is now commonly performed for elective cases, offering improved postoperative outcomes. However, emergency situations may still require open procedures due to the need for rapid access and bleeding control.

Long-term follow-up after splenectomy focuses on infection prevention, monitoring blood parameters, and managing cardiovascular risk. Patients are advised to seek immediate medical attention if they develop fever or signs of infection, as delays in treatment can lead to severe outcomes. Medical alert identification is often recommended so that healthcare providers are aware of the patient's splenic status in emergency situations.

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## CONCLUSION

Splenectomy is a life-saving and therapeutically valuable procedure when appropriately indicated. While the removal of the spleen alters immune and hematological function, careful

clinical management can reduce associated risks. Advances in surgical methods and preventive care have improved outcomes for individuals undergoing splenectomy. Ongoing research and patient education continue to play an important role in optimizing long-term health following this procedure.