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An Overview Of Status Post Splenectomy, Role Of Nursing, Paramedics, Psychologist And Clinical Laboratory Teams

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Abstract

People who have had their spleen removed through elective or non-elective splenectomy are at a significant risk of developing serious infections. Overwhelming postsplenectomy infection (OPSI) is a series of events characterized by a fast advance from infection to severe sepsis. Postsplenectomy infection is a critical medical situation that requires immediate attention. It is highly advisable to promptly administer antibiotics upon the initial indication of infection. Typically, in adults, the progression of the disease takes many days but can accelerate within a few hours from the first indication of fever to the development of widespread pneumonia, widespread blood clotting, bleeding and tissue death in the adrenal glands, and tissue death in the kidney tubules. The paramedics play a vital role in evaluating patients with critical conditions before they reach the hospital and implementing effective measures. Similarly, the nursing and clinical laboratory staff have a crucial role in properly managing these cases. Lastly, psychologists play an important role in providing support to patients and their families after a spleenectomy.

Keywords: *The paramedics play a vital role in evaluating patients with critical conditions before they reach the hospital and implementing effective measures.*

Introduction

Splenectomy has been conducted for many centuries before the understanding of the spleen's physiology and function was established. In 1549, the first recorded splenectomy was carried out to surgically remove an oversized spleen that was causing symptoms. In the nineteenth century, it was discovered that removing the spleen (splenectomy) was not an effective treatment for leukemia. However, it was shown to be useful in treating injuries that penetrate the left upper quadrant of the abdomen [1]. In the mid-twentieth century, splenectomy was used as a therapy for idiopathic/immune thrombocytopenia purpura (ITP). Researchers were the first to show that splenectomy led to more infections and weakened immune response to infections. They conducted experiments on rodents, both with and without spleens, by infecting them with the bacillus of rat plague [2]. Occurrences of severe post-splenectomy infection (OPSI) started to emerge, indicating that splenectomy was linked to compromised antibody synthesis and production, along with other immunological deficiencies. The advancement in knowledge regarding the structure and function of the spleen in the past century has influenced the way disorders involving the spleen are approached. It has also led to the creation of measures to prevent post-splenectomy sepsis and improve the outcomes associated with OPSI [3].

Optimizing the management and prevention of OPSI presents numerous issues. Present measures for infection prevention encompass patient education, immunization, and antibiotic prophylaxis, along with continuous participation in a clinical registry like the Spleen Australia registry. The efficacy of vaccinations and antibiotics is constrained, and the inconsistent adherence and compliance to recommendations are contributing factors that hinder the achievement of optimal protection and prevention against infections [4]. This article provides an overview of current tactics for preventing and managing post-splenectomy care. It discusses the difficulties encountered in prevention and management, as well as the necessary solutions to enhance the approach. Additionally, it highlights the involvement of nursing, paramedics, psychologists, and clinical laboratory teams in this process.

Review:

In cases of traumatic occurrences, splenectomy is conducted as a life-saving treatment, as a therapeutic procedure in cases of hematological disorders, as a life-preserving procedure in cases of malignant conditions, and as a method for the diagnosis of disease. It is estimated that around 6.4–7.1 splenectomy procedures are performed for every 100,000 people each year all over the world [5]. The majority of the time, it is carried out for the treatment of hematological diseases and trauma. In a trauma context, approximately one-quarter of all splenectomies are performed. This is typically the case in cases when trauma to the abdomen has resulted in the rupture of the spleen, which then leads to internal bleeding and hemodynamic instability that poses a significant risk to the patient's life [6]. The usage of splenectomy as a treatment for trauma is decreasing as the number of alternative procedures continues to rise. In the context of hematological illnesses, such as immune thrombocytopenia purpura, sickle cell disease, thalassemia, and hereditary spherocytosis, an additional twenty-five percent of splenectomies are carried out. In addition to its application in the treatment of localized cancer, it is also sometimes carried out because of an iatrogenic injury that occurred during an abdominal procedure that was not related to the cancer. Splenic function can be absent (asplenia) after a surgical splenectomy or at birth (congenital asplenia) as a result of genetic abnormalities such as isolated congenital asplenia and asplenia syndrome [7]. Splenic function can also be lost at birth. Splenic function can also be hindered (hyposplenism) as a result of medical diseases. These conditions include, but are not limited to, celiac disease, inflammatory bowel disease, and systemic lupus erythematosus. The physical structure of the spleen makes it easier for it to perform its

physiological tasks, which include filtration and monitoring of cellular quality. In the absence of the spleen, persons who have impairments in these processes are more likely to become infected [5].

In addition to producing antibodies and eliminating infections that are mediated by antibodies, the spleen is also capable of initiating immunological responses to blood-borne antigens. There are cells in the spleen that are not only involved in innate immunity but also in adaptive immunity. An examination of the structure and cellular components of the spleen, which are responsible for the immunological function of the spleen, was carried out quite recently. The ability to identify and eliminate germs that are present in the circulation is possessed by splenic macrophages. Blood is filtered by red pulp macrophages, which also remove germs, damaged erythrocytes, and erythrocyte inclusions from the blood, respectively. Tingible body macrophages are responsible for removing B-cell debris from the germinal center of the follicle at the same time that marginal zone macrophages are responsible for removing cellular debris from the marginal zone. Dendritic cells, natural killer cells, and monocytes are all forms of immune cells that play a role in the process of eliciting T cell responses to pathogens [7]. Macrophages are not the only cells that play this role.

Several T cell zones can be found within the white pulp of the spleen, which is dominated by B cells (follicles). Both the production of particular antibodies for immunity (affinity maturation) and the enhancement of cytotoxic T-cell activity require the presence of splenic B cells by the immune system. Because opsonization is necessary for the process of phagocytosis, certain bacteria, such as encapsulated bacteria, require it. Immunoglobulin (Ig)-M memory B cells, which are abundant in areas where the spleen is operating properly, are responsible for the production of IgM, which functions as an opsonin and helps facilitate the clearance of germs that are contained in polysaccharides. In addition, the spleen is responsible for the production and maintenance of tuftsin, a protein that plays a role in the stimulation of phagocytosis. It is not only built to efficiently offer immunity, but it is also meant to effectively remove injured erythrocytes from the circulation [8]. The cellular structure of the spleen is designed to deliver both of these functions.

On the other hand, there is a substantial body of information suggesting that guidelines are not widely known and adhered to. Even if it was determined that the doctor's knowledge and attitude toward recommendations were suitable, it was still classified as insufficient that health practitioners teach patients and that there was insufficient communication between intersecting disciplines. Therefore, a significant number of patients who have asplenia have inadequate understanding regarding the risks related with their illness and the prevention strategies that are already in place. In addition to the information (transfer) gaps that are mostly described in the literature, additional factors that were discovered for the non-adherence of patients with asplenia include worries over safety, scepticism, and the uncertainty that vaccination is necessary.8. It is possible that increased patient knowledge is one of the most important factors in improving adherence, and primary care practitioners play an essential role in the education of patients and the implementation of preventative strategies [9].

An infectious diseases specialist will provide the intervention, which is a manual-based personalized telephone counselling session on evidence-based information regarding the spleen, asplenia-related infection risks, and advice for infection prevention. The Health Action Process Approach (HAPA), which is a paradigm that gives predictors for the initiation and maintenance of preventative behavior, including vaccination behavior, was utilized as a theoretical foundation. Risk perception, outcome expectancies, and perceived task self-efficacy are some of the predictors that are distinguished into two phases in the HAPA. These predictors influence the formation of an intention (the motivational phase), as well as the planning of action and barrier coping and maintenance self-efficacy, which lead to the

actual behavior (the volitional phase). As a result, our intervention incorporates particular components that encourage the commencement of the process, as well as action-related tactics such as planning and managing barriers, with the latter being accomplished through the implementation of a specialized action plan that is tailored to the specific needs of various patients. The intervention is primarily focused on providing information to medical professionals, with the primary objective being to communicate the most recent guidelines for patients with asplenia in general and the attending patient in particular. Participants are provided with written information that is tailored to both the patient and the doctor, as well as a straightforward vaccination schedule and a medical alert card [10]. This information is provided in conjunction with the telephone intervention.

The incidence of thrombosis following splenectomy is approximately five percent, and it accounts for roughly nineteen percent of instances in patients who are hospitalized. There is a solid evidence for a hypercoagulable state following splenectomy, and it often develops two days after the removal of the spleen. The presence of extreme thrombocytosis has the potential to bring about thrombotic events, which include acute myocardial infarction, mesenteric vein thrombosis, and pulmonary embolism. In cases where the platelet count exceeds 500 × 109/L, it is strongly recommended to employ anticoagulants as a preventative measure. Following a splenectomy, the use of anticoagulant prophylaxis in order to prevent thrombosis has resulted in an increased risk of hemorrhage. Two of the patients in our series had elevated platelet counts; thus, they were given aspirin, clopidogrel, or enoxaparin as a preventative measure for a period of two to three days. These two patients experienced delayed intra-abdominal hemorrhage. During and after surgery, the anticoagulant may be able to resolve the clot in tiny vessels that were not bleeding due to spasm of the small artery or thrombosis in the small vessel. This is the case even if these vessels may not have been tied tightly during the surgery. On the other hand, this hypothesis is not supported by evidence that is sufficiently persuasive because 3.9% of patients who did not have any bleeding had thrombocytosis and were also treated with anticoagulants; nonetheless, there was no bleeding as a result of these treatments [11].

Patients who have splenectomy have a one percent to three percent chance of experiencing pancreatic injury. In patients with a high serum amylase level, it may not be identified clinically, or it may produce clinical pancreatitis and pancreatic fistula at the same time. Evaluation of serum amylase or lipase levels on the second to fourth day following surgery may be of assistance in determining the nature of the pancreatic injury or damage. Typically, symptoms and signs appear between four and five days after a splenectomy has been performed. There was a considerably higher incidence of pancreatitis in patients who had bleeding, which was 28.57%, compared to individuals who did not have any hemorrhage, which was just 1.36 percent. This problem could be avoided by doing a splenectomy with pancreatic tail manipulation that is performed with caution [12].

The short gastric vessels should be clearly separated and ligated or even sutured during the splenectomy procedure. Because a swollen stomach may cause the loss of ties on the stomach, this procedure is necessary. When comparing individuals with hemorrhage to those without hemorrhage, the incidence of stomach flatulence was found to be significantly greater in the former group (57.14% versus 2.88%, $P < 0.0001$). Necrosis of the stomach wall can lead to the formation of a gastric fistula. This necrosis can be caused by the ligation of the short gastric arteries, which occurs when tissue from the gastric wall is incorporated into the suture ligature. A single gastric fistula was observed in our series after the ligation of short gastric vessels during the process of hemostasis. This occurred despite the utilization of nasogastric decompression for a period of three days in order to prevent gastric distension. Therefore, it is essential to take precautions in order to reinforce the stomach wall in the event that the short gastric arteries

have been clipped or ligated in a manner that is too close to the gastric wall [13].

If you continue to experience stomach pain after having your spleen removed, this could be an early indicator of intra-abdominal hemorrhage, which would lead the medical professionals to assume that you are experiencing postoperative bleeding. The intraperitoneal drain that is performed within twenty-four hours of a splenectomy is often less than two hundred to four hundred milliliters. The solution that is drained is typically dark and crimson in color, and the volume that is drained is then gradually lowered. In this particular series, ultrasonography was established in seven out of ten patients who were getting ultrasound scans; ultrasonography was useful in identifying and confirming bleeding [13].

Conclusion:

Before the mid-twentieth century, splenectomy was a frequently performed treatment to address spleen injuries and abnormalities, even though there was minimal understanding of its anatomy, physiology, and function. It is well agreed upon that patients who have undergone splenectomy are more vulnerable to infection, particularly a serious infection called overwhelming post-splenectomy infection (OPSI). OPSI, or Overwhelming Post-Splenectomy Infection, is a medical illness marked by severe sepsis. It typically affects individuals who have undergone spleen removal (splenectomy) or have a spleen that is not working properly (hyposplenic). It carries a substantial risk of mortality and morbidity. Sepsis often occurs in conjunction with bacteria that are not effectively opsonized, particularly encapsulated bacteria such as Streptococcus pneumoniae. The spleen is a component of the reticuloendothelial system that facilitates the opsonization and phagocytosis of pathogens, as well as the maintenance of cellular function. Splenectomy is associated with a reduction in the production of immunoglobulins, hindrance of the process of clearing antibodies, and phagocytosis, leading to an increased vulnerability to infection and sepsis. Promptly identifying patients at risk, conducting blood cultures prior to administering antibiotics, performing urgent blood smears and quick pathogen-detection assays, and implementing sepsis bundles are crucial steps. Effective and proactive management, combined with intense treatment, can alter the course of the disease in individuals who have undergone splenectomy and are at risk. Vaccination, chemoprophylaxis, and patient education are successful strategies for preventing overwhelming post-splenectomy infection. Moreover, this plays a pivotal role in the domains of nursing, paramedics, psychiatry, and clinical laboratory teams. An evidence-based methodology can be utilized on a busy academic trauma service to ensure consistent and high-quality provider education. Despite the use of enhanced educational initiatives, the post-intensive care unit (ICU) follow-up for trauma patients remains inadequate. The lack of ability to communicate with patients after their release hinders the collection of precise outcome data.

Reference

[1] Bianchi FP, Stefanizzi P, Spinelli G, et al.. Immunization coverage among asplenic patients and strategies to increase vaccination compliance: a systematic review and meta-analysis. Expert Rev Vaccines 2021;20:297–308. 10.1080/14760584.2021.1886085

[2] Theilacker C, Ludewig K, Serr A, et al.. Overwhelming postsplenectomy infection: a prospective multicenter cohort study. Clin Infect Dis 2016;62:871–8. 10.1093/cid/civ1195

[3] Davies JM, Lewis MPN, Wimperis J, et al.. Review of guidelines for the prevention and treatment of infection in patients with an absent or dysfunctional spleen: prepared on behalf of the British Committee for standards in haematology by a working party of the haemato-oncology task force. Br J Haematol 2011;155:308–17. 10.1111/j.1365-2141.2011.08843.x

[4] Lammers AJJ, Hoekstra JBL, Speelman P, et al.. Physicians report barriers to deliver

best practice care for asplenic patients: a cross-sectional survey. PLoS One 2011;6:e17302. 10.1371/journal.pone.0017302

[5] El-Alfy MS, El-Sayed MH. Overwhelming postsplenectomy infection: is quality of patient knowledge enough for prevention? Hematol J 2004;5:77–80. 10.1038/sj.thj.6200328

[6] Kealey GP, Dhungel V, Wideroff MJ, et al.. Patient education and recall regarding postsplenectomy immunizations. J Surg Res 2015;199:580–5. 10.1016/j.jss.2015.05.063

[7] Meerveld-Eggink A, de Weerdt O, Rijkers GT, et al.. Vaccination coverage and awareness of infectious risks in patients with an absent or dysfunctional spleen in the Netherlands. Vaccine 2008;26:6975–9. 10.1016/j.vaccine.2008.09.052

[8] Di Sabatino A, Lenti MV, Tinozzi FP, et al.. Vaccination coverage and mortality after splenectomy: results from an Italian single-centre study. Intern Emerg Med 2017;12:1139–47. 10.1007/s11739-017-1730-9

[9] Woolley I, Jones P, Spelman D, Gold L. Cost-effectiveness of a post-splenectomy registry for prevention of sepsis in the asplenic. Aust N Z J Public Health. 2006;30(6):558-561.

[10] Germing U, Giagounidis A, Strupp C. Prevention of post- splenectomy sepsis. Hematol J. 2001;2(1):67-68.

[11] Waghorn DJ. Overwhelming infection in asplenic patients: current best practice preventive measures are not being followed. J Clin Pathol. 2001;54(2):214-218.

[12] Bonanni P, Grazzini M, Niccolai G, Paolini D, Varone O, Bartoloni A, Bartalesi F, Santini MG, Baretti S, Bonito C, et al. Recommended vaccinations for asplenic and hyposplenic adult patients. Hum Vaccin Immunother. 6 ed. 2017;13(2):359–368. doi: 10.1080/21645515.2017.1264797.

[13] Di Sabatino A, Lenti MV, Tinozzi FP, Lanave M, Aquino I, Klersy C, Marone P, Marena C, Pietrabissa A, Corazza GR. Vaccination coverage and mortality after splenectomy: results from an Italian single-centre study. Intern Emerg Med. 2017;12(8):1139–1147. doi: 10.1007/s11739-017-1730-9.