

An Overview on Abdominal Wound Dehiscence

Mennat Allah Oda Adly Salem Oda¹, Alaa Mohammed Ebrahim Khalil², Ismail Tantawy¹, Hesham Mohamed Kasem¹, Khalid Shreef¹

¹Department of Pediatric Surgery, Faculty of Medicine, Zagazig University, Egypt

²Department of General Surgery, Faculty of Medicine, Zagazig University, Egypt

***Corresponding author:** Mennat Allah Oda Adly Salem Oda

E-mail: Mennaodaadly@gmail.com

Abstract:

Abdominal wound dehiscence is one of the most serious postoperative complications following abdominal surgery, associated with high morbidity, prolonged hospitalization, increased healthcare costs, and a mortality rate that can reach up to 45%. It represents a partial or complete disruption of a laparotomy wound closure, leading to separation of fascial layers and, in severe cases, evisceration. The incidence ranges between 0.4% and 3% of abdominal surgeries and is influenced by patient factors, surgical technique, and postoperative care. Early diagnosis, preventive measures, and timely management are crucial to reducing adverse outcomes.

Keywords: Abdominal wound dehiscence; Burst abdomen; Postoperative complications; Fascial closure; Risk factors; Evisceration.

Introduction:

Abdominal wound dehiscence is a serious postoperative complication of abdominal surgery, often occurring between the 5th and 10th postoperative day, and remains a significant cause of morbidity and mortality despite advances in surgical care. It is characterized by partial or complete separation of the abdominal wound layers, with the risk of evisceration in severe cases. The reported incidence ranges from 0.4% to 3% of laparotomies, and mortality rates may reach up to 45% depending on the severity and timing of intervention (1).

Several patient-related and surgical factors have been identified as contributors to wound dehiscence. Advanced age, malnutrition, diabetes mellitus, obesity, corticosteroid therapy, intra-abdominal sepsis, and prolonged operative times increase the likelihood of this complication. In addition, improper closure technique, inappropriate suture selection, and postoperative infection significantly compromise fascial healing. Preventive measures such as optimization of comorbidities, use of evidence-based closure methods like the "small bites" technique, and careful postoperative monitoring are crucial to reducing the risk and improving patient outcomes (2).

Abdominal wound dehiscence or evisceration is a postoperative wound sutures loss of tightness with the separation of wound edges of the abdominal wall. Moreover, it is life threatening complication and the incidence increases within the age up to 10 % among the elderly with the mortality rate up to 25 %. The treatment of wound evisceration may be dual: conservative or surgical treatment. The latter is the most common option with urgent repeated midline laparotomy and revision. In order to avoid and reduce the rate of wound dehiscence, the need of risk factors identification is mandatory (3, 4).

Types of Abdominal wound dehiscence

Abdominal wound dehiscence (AWD) can present in two distinct forms: partial or complete dehiscence, each with specific clinical features and implications (5).

- **Partial Dehiscence**

This type of dehiscence involves the separation of the skin and/or deeper tissue layers of the surgical wound while the underlying fascial layer remains intact. In partial dehiscence, the wound edges may be gaping, but the deeper layers, including the fascia, do not open up to expose internal organs. This form of dehiscence does not involve the protrusion of viscera or omentum through the wound. Although less severe than complete dehiscence, partial dehiscence can still lead to complications such as wound infection or delayed healing, and may necessitate additional surgical intervention to restore proper closure and prevent further issues (6).

Complete Dehiscence

Complete dehiscence is a more severe form of wound failure where the entire thickness of the abdominal wall is compromised. This condition is characterized by the exposure of internal structures through the wound. In cases of complete dehiscence, the intestines, omentum, or other abdominal viscera become visible through the open wound. This form of dehiscence poses significant risks, including potential exposure of internal organs to the external environment, increased risk of infection, and further systemic complications. Complete dehiscence often requires urgent surgical intervention to repair the defect and address any associated complications, such as contamination or damage to the exposed organs (7).

Epidemiology

Wound dehiscence, a severe postoperative complication, occurs with significantly higher frequency in low-resource settings, particularly in Africa, compared to developed countries. In high-resource environments, the incidence of wound dehiscence ranges from 0.2% to 1.2%, reflecting the advanced medical care and preventive measures available. However, in low-resource settings the incidence is notably higher at 2.1% (8).

A recent study focusing on abdominal wound dehiscence (AWD) in neonates revealed an incidence rate of 6.0%. This condition typically manifests between three to eight days post-surgery, with most cases occurring within the first week. The early onset of AWD underscores the vulnerability of neonates (9).

The mortality associated with wound dehiscence in low-resource settings is alarmingly high, ranging from 8% to 45%. Several factors contribute to this elevated mortality rate, including the nature of the surgery (emergency procedures being particularly high-risk), the class of the wound (with contaminated or infected wounds being more prone to dehiscence), and postoperative complications such as abdominal distension (10).

Signs and Symptoms of Wound Dehiscence

Surgical wounds that exhibit signs of dehiscence may present with a variety of visual and symptomatic indicators. These manifestations suggest a disruption in the normal healing process and may signal underlying complications, including infection. The following signs and symptoms are commonly associated with wound dehiscence (11):

1. Visual Indicators of Healing Disruption (12, 13):

- **Separated Sutured Margins:** One of the most direct signs of wound dehiscence is the separation of sutured margins at any point along the incision site. This separation indicates that the wound edges are no longer approximated, potentially exposing deeper layers of tissue.
- **Broken Sutures:** The presence of broken or loosened sutures is another critical sign. These disruptions in sutures can prevent proper wound closure and contribute to further separation of the incision margins.
- **Redness at the Incision Site:** Erythema or redness around the incision site may indicate inflammation or infection. This localized redness often accompanies other signs of dehiscence and warrants further evaluation.

2. Symptomatic Indicators of Disruption (14, 15):

- **Pain at the Incision Site:** Patients may report increased pain at the incision site, which can be indicative of ongoing inflammation or infection. Pain may be localized and persistent, contributing to patient discomfort and necessitating assessment.
- **Swelling, Edema, or Seroma:** The accumulation of fluid, such as seroma, or generalized swelling at the wound site is indicative of a disruption in the healing process. Edema may exacerbate the separation of wound edges and complicate recovery.
- **Bleeding:** Active bleeding from the incision site may occur if the wound dehiscence involves damage to blood vessels. This bleeding can range from mild oozing to more significant hemorrhage, depending on the extent of the disruption.
- **Exudate from the Incision Site:** The presence of abnormal exudate, including purulent or serous fluid, can be a sign of infection or excessive drainage. This fluid may accumulate in and around the wound, further disrupting the healing process.

Causes of Wound Dehiscence

Wound healing is a complex, multi-phase process comprising inflammation, proliferation, and maturation. Wound dehiscence can occur during any of these phases due to various factors:

- **Inflammatory Phase:** During this initial phase, the body mobilizes fluid and inflammatory cells to the wound site, resulting in swelling, redness, and pain. The primary objective is to clear dead cells and bacteria, enabling subsequent repair. However, if infection occurs, the inflammatory response may persist, hindering the transition to the proliferative phase. Infection prevents effective fibroblast activity, leading to weak and fragile repair tissue (16).
- **Proliferative Phase:** In this stage, fibroblasts work to close the wound by pulling its edges together and forming new tissue. Wound dehiscence may occur if the repair process is interrupted by factors such as inadequate fibroblast activity due to ongoing infection or excessive pressure on the sutures (17).
- **Maturation Phase:** The final phase involves strengthening of the newly formed tissue. Dehiscence during this phase can result from poor suture technique or premature removal of stitches. Improper suture placement or early removal can compromise the integrity of the wound, leading to separation (18).

Additionally, Persistent infection can hinder wound healing by keeping the body focused on fighting bacteria instead of repairing tissue, leading to weakened tissue strength and a higher risk of dehiscence. Excessive strain from activities like vomiting, severe coughing, or heavy lifting can stress sutures or staples, potentially causing wound separation. Poor suture technique, including incorrect placement or premature removal, may also contribute to dehiscence. Additionally, conditions that impair blood flow such as smoking, diabetes, obesity, and cardiovascular disease can impede healing by limiting oxygen and nutrient delivery and waste removal (19).

Risk Factors for Abdominal Wound Dehiscence

Surgical Factors

- **Type of Incision**

The type of incision made during abdominal surgery significantly influences the risk of wound dehiscence. Incisions can be classified based on their orientation and the extent of the surgical exposure they provide. Vertical incisions, often used for extensive abdominal surgeries, are generally associated with a higher risk of dehiscence compared to transverse incisions. This is due to the greater tension placed on the wound edges in vertical incisions, which can disrupt the healing process and increase susceptibility to wound breakdown (20).

Furthermore, vertical incisions are more likely to encounter increased intra-abdominal pressure during postoperative periods, compounding the risk of dehiscence. Studies have demonstrated that median incisions, which are typically vertical and extend from the xiphoid process to the pubic symphysis, carry a higher risk of complications compared to transverse incisions, which follow the natural lines of tension in the abdominal wall (21).

- **Duration of Surgery**

The duration of the surgical procedure is a critical factor affecting wound healing and the risk of dehiscence. Prolonged surgical times can lead to increased tissue ischemia and impaired wound healing. Extended operative times often result in greater tissue manipulation and trauma, which can disrupt the natural healing process and compromise the integrity of the surgical closure(22).

Additionally, longer surgeries may increase the risk of infection due to extended exposure of the wound to the environment. This is particularly relevant in complex procedures that require more time to complete, as the increased duration can exacerbate the risk of wound dehiscence by inducing more significant inflammatory responses and reducing the wound's overall healing capacity (23).

- **Emergency Surgeries**

Emergency surgeries inherently carry a higher risk of wound dehiscence compared to elective procedures. The urgency of emergency surgeries often necessitates rapid decision-making and may limit the ability to optimize preoperative and intraoperative conditions. These procedures are frequently associated with higher levels of contamination and increased chances of inadequate wound closure due to the rushed nature of the operation (24).

Moreover, emergency surgeries often involve patients with preexisting conditions or complications that can further compromise wound healing. The increased stress and physiological strain on the patient during emergency situations can lead to suboptimal wound healing environments, raising the likelihood of wound dehiscence (25).

Patient-Related Factors

- **Age and Developmental Vulnerabilities**

Age plays a pivotal role in the risk of abdominal wound dehiscence, with neonates and elderly patients exhibiting distinct vulnerabilities. In neonates, the abdominal wall is thinner and less resilient, which increases the likelihood of wound dehiscence. Additionally, the immature connective tissue and delayed collagen synthesis in newborns contribute to weaker wound healing (26).

In older adults, age-related physiological changes, such as decreased skin elasticity and reduced cellular regenerative capacity, similarly predispose them to complications. The age-related differences in wound healing processes necessitate tailored surgical approaches and postoperative care strategies to mitigate the risk of wound dehiscence in these vulnerable populations (27).

- **Nutritional Status**

Nutritional status is a critical determinant of wound healing and susceptibility to wound dehiscence. Malnutrition, characterized by deficiencies in essential nutrients such as proteins, vitamins, and minerals, impairs collagen synthesis and fibroblast function, leading to weakened wound integrity. Hypoproteinemia, often a result of malnutrition or systemic disease, is particularly detrimental, as it reduces the levels of albumin and other proteins vital for maintaining wound tensile strength and preventing edema (28). Adequate nutritional support preoperatively and postoperatively is crucial for promoting optimal wound healing and reducing the risk of dehiscence. Nutritional assessment and intervention should be integral components of the surgical care plan to address and rectify deficiencies that could compromise wound healing (29).

- **Infection and Sepsis**

Infection is a major risk factor for abdominal wound dehiscence, as it impairs the normal healing process and can lead to tissue breakdown. Surgical site infections (SSI) increase the likelihood of wound dehiscence by introducing pathogens that provoke an inflammatory response and disrupt the wound repair mechanisms. Sepsis, a systemic infection characterized by widespread inflammation and organ dysfunction, further exacerbates this risk (30).

The presence of sepsis can lead to compromised immune function and reduced tissue perfusion, hindering the body's ability to effectively manage and heal the wound. Preventive measures, including aseptic techniques, appropriate antibiotic prophylaxis, and vigilant postoperative monitoring, are essential to minimize the risk of infection and sepsis, thereby reducing the likelihood of wound dehiscence (31).

- **Comorbidities**

Comorbid medical conditions can significantly impact wound healing and increase the risk of dehiscence. Chronic diseases such as diabetes mellitus, obesity, and autoimmune disorders can impair wound repair by affecting various aspects of the healing process. For instance, diabetes mellitus is associated with delayed wound healing due to impaired glucose metabolism and decreased immune function. Obesity increases intra-abdominal pressure and can lead to wound dehiscence due to the mechanical stress on the incision site (32). Autoimmune disorders may interfere with normal tissue repair and increase susceptibility to infections. Managing these comorbidities through preoperative optimization and targeted postoperative care is crucial for reducing the risk of wound complications and improving overall surgical outcomes (33).

- **Immunosuppression**

Patients with compromised immune systems, whether due to underlying conditions or the use of immunosuppressive therapies, face an increased risk of wound dehiscence. Immunosuppression impairs the body's ability to mount an effective inflammatory and repair response, leading to slower wound healing and a higher susceptibility to infections. This increased risk necessitates careful management of immunosuppressive therapy and close monitoring of wound healing progress (34).

In cases where immunosuppression is unavoidable, additional precautions, such as enhanced aseptic techniques and tailored antibiotic prophylaxis, should be implemented to mitigate the risk of wound complications and ensure better surgical outcomes (35).

- **Blood Supply and Perfusion**

Adequate blood supply and tissue perfusion are essential for effective wound healing. Impaired blood flow can result from vascular disease, smoking, or other factors that compromise the oxygen and nutrient delivery to the wound site.

Insufficient perfusion leads to tissue ischemia, delayed collagen formation, and increased risk of necrosis and infection. Preoperative assessment of vascular status and addressing factors that impair blood flow are critical steps in reducing the risk of wound dehiscence. Ensuring optimal perfusion through appropriate surgical techniques and postoperative care can significantly improve healing outcomes and minimize complications (36).

Protective Factors for Abdominal Wound Dehiscence

- ***Patient Weight and Nutritional Status***

Patient weight and nutritional status are critical protective factors in reducing the risk of abdominal wound dehiscence. Adequate nutritional status supports effective wound healing by providing essential nutrients required for cellular repair and collagen synthesis. Patients with a healthy body weight and good nutritional status generally have better wound tensile strength and improved resistance to complications (37).

Adequate protein intake, in particular, is crucial for collagen formation and tissue repair, contributing to stronger and more resilient wounds. Furthermore, maintaining an optimal body weight helps minimize the mechanical stress on the wound, reducing the risk of dehiscence. Preoperative nutritional assessment and optimization are essential components of surgical planning to ensure that patients are in the best possible condition for wound healing and to enhance overall surgical outcomes (38).

- ***Choice of Incision Type***

The choice of incision type plays a significant role in mitigating the risk of abdominal wound dehiscence. Surgical techniques that involve less invasive approaches or those that optimize the alignment and closure of the incision can significantly reduce the likelihood of complications. For instance, incisions made along natural skin lines or those that employ techniques to minimize tension on the wound edges generally have lower rates of dehiscence (39).

Additionally, the use of appropriate closure techniques, such as layered closure and tension-reducing sutures, can enhance the strength and stability of the wound. Surgeons must carefully consider the incision type based on the patient's anatomy and the surgical procedure to ensure optimal outcomes and reduce the risk of wound complications. Proper technique in incision placement and closure is a critical factor in promoting successful wound healing and preventing dehiscence (40).

Clinical Evidence

Recent research has shed light on various risk and protective factors associated with abdominal wound dehiscence in pediatric patients. It was found that vertical incisions pose a higher risk for dehiscence compared to transverse incisions, with infants under one year old being particularly susceptible. These findings were further corroborated, noting that the risk of dehiscence increases with age under one month and with the use of median incisions (41).

A study provided an additional context, highlighting several critical risk factors: age under one year, the urgency of emergency surgeries, the use of median incisions, and surgical durations exceeding three hours. They also emphasize the increased risk associated with procedures lasting more than two hours, indicating the importance of surgical duration in dehiscence risk (42).

A study identified hypoproteinemia and preoperative anemia as significant contributors to wound dehiscence. Their study also highlights protective factors, including higher patient weight at admission and the choice of non-median incision types, such as transverse incisions. These factors have been reaffirmed as crucial for reducing the risk of dehiscence (6).

A study expanded on these findings by focusing on the vulnerabilities specific to neonates, particularly those born prematurely or with low birth weight. The collective insights from these studies underscore a complex interplay of factors, from surgical techniques to patient characteristics, influencing abdominal wound dehiscence risk (43).

A recent study provides new insights into the factors contributing to abdominal wound dehiscence (AWD) in neonates. This research involved analyzing a cohort of neonates who underwent abdominal surgery, focusing on identifying risk factors, surgical techniques, and patient characteristics associated with an increased likelihood of AWD. The study found that the incidence of AWD was notably high among preterm neonates compared to full-term neonates. Specifically, 22% of preterm neonates experienced AWD, while only 4% of full-term neonates did. The research highlighted several key risk factors, including gestational age, birth weight, Apgar scores, and exposure to postnatal steroids and NSAIDs. Additionally, blood parameters such as decreased hemoglobin, hematocrit, and platelet levels were linked to a higher risk of AWD (44).

Perioperative factors also played a significant role. Neonates with AWD had longer intubation times and were more likely to undergo relaparotomy. Increased blood transfusion during surgery was observed in this group. Surgical techniques were examined, revealing that non-absorbable sutures were used more frequently in patients who developed AWD. The study also noted that while ostomy placement was common in AWD cases, the location of the ostomy (inside or outside the incision) did not significantly impact the risk (45).

Post-surgery, neonates with AWD exhibited increased signs of inflammation, including redness and abscesses at the wound site, and had higher rates of positive local bacteriological cultures. These findings underscore the importance of managing postoperative care to prevent complications. Among the subset of neonates with necrotizing enterocolitis (NEC) or intestinal perforations, postnatal steroid use, low leukocyte counts, and prolonged intubation times were strongly associated with AWD. The presence of ostomy did not significantly affect the incidence of AWD in this subgroup (44).

Assessment and Classification of Wound Dehiscence

Accurate assessment and classification of wound dehiscence are crucial for effective management and documentation. It involves a comprehensive evaluation of the wound's characteristics and ongoing patient assessment. Proper documentation in patient notes and the wound care plan is essential for tracking the progression of the wound and informing treatment decisions (46).

➤ **Comprehensive Wound Assessment:**

To effectively manage wound dehiscence, the following elements should be meticulously recorded:

- **Size:** Measure and document the dimensions of the wound, including length, width, and depth. Regular measurements are important for assessing changes in wound size over time and evaluating healing progress.
- **Tissue Involvement/Characteristics:** Assess the type of tissue involved in the dehiscence. This includes identifying whether the dehiscence involves only the skin, subcutaneous tissue, or deeper structures such as fascia or muscle. Note the appearance of the tissue (e.g., necrotic, granulating) (47).
- **Exudate Type/Amount:** Document the type (serous, sanguineous, purulent) and amount of exudate. Excessive or abnormal exudate can indicate infection or other complications.
- **Presence of Odour:** Record any unusual or offensive odour emanating from the wound, as it may suggest the presence of infection or necrotic tissue (48).
- **Pain Assessment:** Evaluate and document the patient's pain level at the wound site. Use standardized pain scales to quantify pain and guide pain management strategies.

➤ **Clinical Indicators of Infection in Wound Management**

Accurate identification and management of clinical indicators of wound infection are essential for effective patient care and optimal surgical outcomes. Clinicians should refer to published guidelines and local protocols for the detection, diagnosis, and management of postoperative wound infections. It is critical to document all indicators in the patient's notes and care plan, report them to the nurse in charge and medical staff, and develop a detailed plan of care with achievable evaluation dates (49). The following indicators are key in assessing wound infection:

- **Dull Wound Tissue:** Wound tissue that appears dull or discolored can indicate compromised healing and potential infection. Healthy granulating tissue should have a pink or red appearance, while dull or grayish tissue may suggest necrosis or inadequate blood supply (50).
- **Slough:** Slough is a type of necrotic tissue that may appear yellow or gray and is typically moist. The presence of slough indicates a delay in wound healing and potential infection, as it can harbor bacteria and impede the formation of healthy granulation tissue (51).
- **Failure of Wound to Decrease in Size:** A wound that does not progressively decrease in size or shows signs of increased dimensions may be indicative of infection or other complications. Regular measurement of wound dimensions helps in monitoring healing progress and detecting abnormalities (52).
- **Hypergranulation:** Hypergranulation occurs when there is an excessive formation of granulation tissue that protrudes above the level of the surrounding skin. This condition can impede wound closure and may be associated with infection or irritation (53).

- **Increased Exudate:** An increase in the amount or change in the type of exudate (e.g., from serous to purulent) can signal infection. High levels of exudate may also contribute to maceration of surrounding skin and further complicate wound healing (54).
- **Erythema:** Erythema, or redness around the wound site, is a common indicator of inflammation or infection. An increase in the area of redness, particularly if it is spreading, suggests an ongoing infectious process (55).
- **Increased or Unexplained Pain:** Pain that intensifies or is unexplained relative to the expected postoperative course can be a sign of infection. Pain assessment should be regularly performed and documented to detect any changes in the patient's condition.
- **Malodour:** An unpleasant odor emanating from the wound is often associated with the presence of bacteria or necrotic tissue. Malodour is a significant indicator of infection and should be addressed promptly.
- **Confirmed Presence of Infection (Microbiology):** The confirmation of infection through microbiological analysis of wound cultures provides definitive evidence of pathogenic involvement. Positive culture results should guide targeted antibiotic therapy and wound management strategies.
- **Increased Temperature of Periwound Tissue:** An elevated temperature in the tissue surrounding the wound may indicate localized infection or inflammation. Monitoring the periwound temperature helps in assessing the severity of infection and guiding treatment decisions (37).

Preventive Strategies for Abdominal Wound Dehiscence (AWD) in Neonates

Preoperative Interventions

Effective preoperative management is crucial for minimizing the risk of abdominal wound dehiscence (AWD) in neonates. This involves addressing factors such as anemia and electrolyte imbalances that can impact wound healing and overall surgical outcomes (56).

- **Correction of Anemia**

Anemia, characterized by reduced hemoglobin levels, can impair tissue oxygenation and hinder wound healing. Preoperative correction of anemia through blood transfusions or iron supplementation can significantly enhance tissue perfusion and support the healing process. Ensuring optimal hemoglobin levels before surgery helps to reduce the risk of wound complications and improve postoperative recovery (57).

- **Management of Electrolyte Imbalances**

Electrolyte imbalances can affect cellular function and metabolic processes, making it essential to address these issues before surgery. Proper correction of electrolyte disturbances helps stabilize physiological functions, which is critical for neonates undergoing abdominal surgery. Preoperative electrolyte management can prevent complications and support overall recovery (58).

Surgical Techniques

The choice of surgical technique and incision type plays a significant role in reducing the risk of AWD.

- **Selection of Incision Type**

Choosing the appropriate type of incision can minimize the risk of wound complications. Transverse incisions are generally associated with a lower risk of dehiscence compared to vertical incisions. This is because transverse incisions often result in less tension on the wound edges and a lower likelihood of wound separation (46).

- **Optimizing Surgical Duration**

Reducing the duration of surgery can help minimize the risk of AWD. Prolonged surgical procedures increase the risk of tissue damage and infection, which can contribute to wound dehiscence. Effective surgical planning and techniques aimed at minimizing operative time can enhance outcomes and reduce the likelihood of complications (59).

Patient Monitoring and Early Intervention

Ongoing monitoring and early intervention are critical for preventing and managing AWD in neonates.

- **Regular Wound Assessment:** Postoperative monitoring of the surgical wound is essential for detecting early signs of dehiscence or infection. Regular wound assessments allow for timely identification of complications and prompt intervention to address issues before they progress (46).

- **Nutritional Support:** Providing adequate nutritional support is vital for optimal wound healing. In neonates who are unable to take oral feeds, total parenteral nutrition (TPN) may be required to ensure adequate nutrient intake and support healing. Additionally, monitoring for signs of malnutrition or hypoproteinemia and addressing these conditions can help prevent complications such as AWD (46).
- **Infection Control:** Implementing strict infection control measures is crucial for preventing wound contamination and subsequent dehiscence. This includes maintaining a sterile surgical environment, using prophylactic antibiotics when indicated, and ensuring proper postoperative wound care (42).

The findings of a recent study underscore several critical preventive strategies for reducing abdominal wound dehiscence (AWD) in pediatric surgical populations. One of the major factors contributing to wound dehiscence identified was wound contamination. To mitigate this, strict adherence to infection control practices is essential. Implementing routine preoperative screening for contamination risks and ensuring the use of sterile techniques can help in minimizing contamination. Furthermore, administering prophylactic antibiotics within the recommended timeframe—ideally within 60 minutes of incision as per the WHO Surgical Safety Checklist—can significantly reduce the risk of surgical site infections (SSI) and subsequent wound complications (8).

Management of Wound Dehiscence

➤ Determining the Goal of Care for Wound Dehiscence

The goal of care for wound dehiscence may differ from the objectives associated with healing by primary intention. Clear, achievable goals must be established, documented, and discussed with the patient, including a detailed explanation of all planned interventions (60). The primary objective is to prepare the wound bed for optimal closure, which may involve:

1. Assessment and Identification (61):

- **Wound Bed Evaluation:** Assess the wound bed to identify and address any necrotic tissue and signs of infection. Regular evaluations help in tailoring the appropriate treatment plan.
- **Infection Management:** If infection is suspected, prompt and appropriate use of antibiotics is crucial. Infection control may also involve the removal of drains, sutures, or staples, and performing surgical debridement as necessary.

2. Wound Closure Strategies (62):

- **Secondary Intention:** For superficial dehiscence, the wound may be managed through secondary intention, allowing the wound to close naturally over time.
- **Advanced Interventions:** Large or deep wound dehiscence may require advanced interventions such as Negative Pressure Wound Therapy (NPWT) and possibly a return to the operating theatre for closure.

3. Referral and Collaboration (63):

- **Specialist Referral:** Referral to tissue viability services and consultation with the medical team should be considered for specialized advice and care. This ensures comprehensive management and optimized healing outcomes.

4. Documentation and Communication (64):

- **Care Plan Documentation:** Clearly document the goal of care, planned interventions, and evaluation dates in the patient's notes. This ensures consistency in care and facilitates ongoing monitoring and adjustments.
- **Patient Communication:** Discuss the care goals and planned interventions with the patient, ensuring they understand the rationale behind each step and the expected outcomes.

➤ Treatment strategies

Treatment strategies generally include pain management, infection control, risk factor modification, removal of necrotic tissue, and advanced therapies such as negative pressure wound therapy (65).

- **Pain Management:** Effective pain management is crucial in the treatment of wound dehiscence. Pain relief may be achieved through analgesics or opioids, depending on the severity of the discomfort. Nonsteroidal anti-inflammatory drugs (NSAIDs) can be used for mild to moderate pain, while stronger narcotics may be prescribed for severe pain. Additionally, the choice of wound dressings can impact pain levels; advanced dressings such as

hydrocolloids or foam dressings may reduce discomfort during dressing changes by minimizing friction and absorption of exudate (66).

- **Antibiotic Therapy:** Antibiotic administration is critical when there is evidence of infection or a high risk of infection due to wound exposure. Empirical antibiotic therapy should be guided by the local antibiogram and tailored based on culture results if available. Commonly used antibiotics include broad-spectrum agents such as ceftriaxone or piperacillin-tazobactam, particularly if polymicrobial infection is suspected. The duration of antibiotic therapy typically ranges from 5 to 14 days, depending on the clinical response and the presence of systemic symptoms (67).
- **Management of Risk Factors:** Addressing underlying risk factors is essential for optimizing wound healing. In patients with diabetes, strict glycemic control is necessary to enhance wound healing and reduce the risk of infection. Blood glucose levels should be monitored and managed with insulin or oral hypoglycemics as appropriate. In cases where wound dehiscence is associated with fluid accumulation, such as seroma or hematoma, percutaneous drainage may be performed using a catheter or drain to alleviate pressure and prevent further complications (68).
- **Removal of Necrotic Tissue:** Necrotic or devitalized tissue impairs wound healing and can be a substrate for infection. Debridement is the process of removing nonviable tissue to promote healing and reduce infection risk. This can be achieved through various methods, including sharp debridement with surgical instruments, enzymatic debridement using topical agents such as collagenase, or mechanical debridement with hydrotherapy. In cases of extensive necrosis or deep dehiscence, surgical revision may be required to remove dead tissue and facilitate proper wound closure (69).
- **Negative Pressure Wound Therapy (NPWT):** NPWT is an advanced therapeutic modality employed for complex or non-healing wounds. It involves the application of a vacuum through a specialized dressing placed over the wound. This therapy promotes wound healing by removing excess exudate, reducing edema, and increasing local blood flow. The vacuum-assisted closure (VAC) device maintains a controlled negative pressure environment, which encourages granulation tissue formation and reduces bacterial load. NPWT is particularly beneficial for wounds with large amounts of fluid or those failing to progress with standard treatments (70).

Wound Closure: The decision to close a dehiscent wound may involve re-suturing or allowing natural healing by secondary intention. Primary closure with sutures, staples, or skin adhesive is indicated for less complex dehiscence. In cases of deep or extensive wound separation, surgical intervention may be necessary to repair the wound effectively. This may involve layered closure techniques, the use of local flaps, or grafting procedures depending on the wound characteristics and the extent of tissue loss (71).

References:

1. Webster C, Neumayer L, Smout R, Horn S. Laparotomy wound dehiscence: a continuing problem. *Am J Surg.* 2021;221(1):165-171.
2. Diener MK, Voss S, Jensen K, Büchler MW, Seiler CM, Neugebauer E, et al. Elective midline laparotomy closure: the INLINE systematic review and meta-analysis. *Ann Surg* 2010;251(5):843-56.
3. Aziz A, Alam SN, Shaikh I, Manzar SJPJS. Abdominal wound dehiscence: An ongoing dilemma. 2009;25:204-8.
4. Teklewold B, Pioth D, Dana TJSR, Practice. Magnitude of abdominal wound dehiscence and associated factors of patients who underwent abdominal operation at st. Paul's hospital millennium medical college, addis ababa, Ethiopia. 2020;2020(1):1379738.
5. Duan S, Zhang X, Jiang X, Ou W, Fu M, Chen K, et al. Risk Factors for Abdominal Wound Dehiscence in Neonates: A Retrospective Cohort Study. 2020.
6. Fu M, Li J, Zhang X, Jiang X, Ou W, Chen K, et al. Prediction values of a novel prognostic index hypoproteinemia combined with contaminated wounds for wound dehiscence after abdominal surgery in neonates. 2023.
7. Bitterman N, Ben-Nun O, Calderon N, Brodsky A, Galis I, Matter I, et al. Use of autologous dermal flap as mesh coverage in the treatment of large abdominal-wall defect in patients following massive weight loss: presentation of a novel surgical technique. 2020;24:387-93.

8. Temesgen F, Gosaye A, Starr N, Kiflu W, Getachew H, Dejene B, et al. Early outcome of laparotomy wounds in pediatric patients in TASH, Addis Ababa, Ethiopia: a six-months prospective study. *Ethiopian journal of health sciences*. 2021;31(1).
9. Duan S, Zhang X, Jiang X, Ou W, Fu M, Chen K, et al. Risk factors and predictive model for abdominal wound dehiscence in neonates: a retrospective cohort study. *Annals of Medicine*. 2021;53(1):900-7.
10. Putra MAD, Manawan EE, Saleh MIJSJoS. Determinant of Abdominal Wound Dehiscence (AWD) in Post-Laparotomy Patients at Dr. Mohammad Hoesin General Hospital, Palembang, Indonesia. 2023;6(2):579-83.
11. Serena TE, Gould L, Ousey K, Kirsner RSJAiWC. Reliance on clinical signs and symptoms assessment leads to misuse of antimicrobials: post hoc analysis of 350 chronic wounds. 2022;11(12):639-49.
12. Tan NR. A comparison between knotless and conventional sutures: A novel approach to third molar surgery: University of Otago; 2022.
13. Bessa G. Bacterial infections. *Dermatology in Public Health Environments: A Comprehensive Textbook*: Springer; 2023. p. 183-202.
14. Stamenkovic DM, Bezmarevic M, Bojic S, Unic-Stojanovic D, Stojkovic D, Slavkovic DZ, et al. Updates on wound infiltration use for postoperative pain management: a narrative review. 2021;10(20):4659.
15. Lyons M, Nunley RM, Ahmed Shokri A, Doneley T, Han H-S, Harato K, et al. Goals, challenges and strategies for wound and bleeding management in total knee arthroplasty: A modified Delphi method. 2022;30(3):10225536221138985.
16. Gupta AJWHRCT, Directions F. Classification of Wounds and the Physiology of Wound Healing. 2021;3-53.
17. Čoma M, Fröhlichová L, Urban L, Zajíček R, Urban T, Szabo P, et al. Molecular changes underlying hypertrophic scarring following burns involve specific deregulations at all wound healing stages (inflammation, proliferation and maturation). 2021;22(2):897.
18. Zhang W, Liu Y, Zhang HJC, bioscience. Extracellular matrix: an important regulator of cell functions and skeletal muscle development. 2021;11(1):65.
19. Niederstätter IM, Schiefer JL, Fuchs PCJMS. Surgical strategies to promote cutaneous healing. 2021;9(2):45.
20. Medina Pedrique M, Robin Valle de Lersundi Á, Avilés Oliveros A, Ruiz SM, López-Monclús J, Munoz-Rodriguez J, et al. Incisions in hepatobiliopancreatic surgery: surgical anatomy and its influence to open and close the abdomen. 2023;2:11123.
21. Pedrique MM, de Lersundi ÁRV, Oliveros AA, Ruiz SM, López-Monclús J, Munoz-Rodriguez J, et al. Incisions in hepatobiliopancreatic surgery: surgical anatomy and its influence to open and close the abdomen. 2023;2.
22. Ahsan A, Haque MF, Islam MRJSJMPS. Risk Factors and Operative Findings of Abdominal Wound Dehiscence in Emergency Laparotomy. 2022;8(8):430-5.
23. Teklemariam BT, Biyana CF, Asfaw SAJEJoHS. Determinants of postoperative abdominal wound dehiscence among patients operated in a tertiary hospital. 2022;32(4):739-46.
24. Lakhani A, Jamel W, Riddiough GE, Cabalag CS, Stevens S, Liu DSJS. Prophylactic negative pressure wound dressings reduces wound complications following emergency laparotomies: A systematic review and meta-analysis. 2022;172(3):949-54.
25. Liu DS, Cheng C, Islam R, Tacey M, Sidhu A, Lam D, et al. Prophylactic negative-pressure dressings reduce wound complications and resource burden after emergency laparotomies. 2021;257:22-31.
26. McNamara SA, Hirt PA, Weigelt MA, Nanda S, de Bedout V, Kirsner RS, et al. Traditional and advanced therapeutic modalities for wounds in the paediatric population: an evidence-based review. 2020;29(6):321-34.
27. Caracino V, Coletta P, Palumbo P, Castiglioni S, Frazzini D, Basti M. Wound Healing in Elderly and Frail Patients. *Emergency laparoscopic surgery in the elderly and frail patient*: Springer; 2021. p. 61-9.
28. Gupta R, Shrivastava SK, Malpani P, Songra MJISJ. A prospective study of assessment of prognostic factors in early and late wound dehiscence in midline vertical incision. 2020;7(8):2578-85.
29. Sultana M, Sultana N, Mostafa B, Khair AB, Islam S, Jannat FJSIJOG. Association of Serum Albumin Level with Wound Healing after Caesarean Section h. 2024;7(6):263-72.

30. Parsanezhad ME, Omidifar N, Rahnavard S, Dehghan A, Bijani MJAJoC, Room HiO. Investigating the Prevalence and Causes of Surgical Site Infection and Surgical Wound Dehiscence After Cesarean Delivery: A Cohort Study in Zeynab Hospital in Shiraz-Iran. 2023;1(1):1-6.
31. Sridhar P, Karthik T, Abhilash G, Sravanthi K, Satyanarayana GJISJ. Identifying risk factors for surgical site infections in abdominal surgeries and establishing common pathogenic bacteria. 2021;8(6):1723-9.
32. Sachin V, Madhusudhan K, Keerthi G. Abdominal Wound Dehiscence Following Laparotomy With Emphasis On The Risk Factors At A Tertiary Care Hospital.
33. Reilly MJ, Larsen NK, Agrawal S, Thankam FG, Agrawal DK, Fitzgibbons RJJTAJoS. Selected conditions associated with an increased incidence of incisional hernia: a review of molecular biology. 2021;221(5):942-9.
34. Matar DY, Ng B, Darwish O, Wu M, Orgill DP, Panayi ACJAIWC. Skin inflammation with a focus on wound healing. 2023;12(5):269-87.
35. Walker A, Wilson M. Surgical Site Infections. Textbook of Emergency General Surgery: Traumatic and Non-traumatic Surgical Emergencies: Springer; 2023. p. 1737-50.
36. Mogoanta SS, Paitici S, Mogoanta CAJAS-ABO. Postoperative follow-up and recovery after abdominal surgery. 2021.
37. Duan S, Zhang X, Jiang X, Ou W, Fu M, Chen K, et al. Risk factors and predictive model for abdominal wound dehiscence in neonates: a retrospective cohort study. 2021;53(1):900-7.
38. Nasrallah AA, Mansour M, Abou Heidar NF, Ayoub C, Najdi JA, Tamim H, et al. Risk factors for wound dehiscence following radical cystectomy: a prediction model. 2021;13:17562872211060570.
39. Nicolajsen CW, Eldrup NJEJoV, Surgery E. Abdominal closure and the risk of incisional hernia in aneurysm surgery—a systematic review and meta-analysis. 2020;59(2):227-36.
40. Garcia-Urena M, C. PSGFBDCKDMAG-UML-CJMMVJdSGAS. Preventing incisional ventral hernias: important for patients but ignored by surgical specialities? A critical review. 2021;25:13-22.
41. Saad HAS, Farid MI, Baz A, Riad M, Eraky ME, Sharaf K. Conclusions from the follow-up of the most recent ECLAPTES recommendations about laparotomy closure procedures. Outcomes of an assessment. 2023.
42. De Simone B, Sartelli M, Coccolini F, Ball CG, Brambillasca P, Chiarugi M, et al. Intraoperative surgical site infection control and prevention: a position paper and future addendum to WSES intra-abdominal infections guidelines. 2020;15:1-23.
43. Paic V, Radu PA, Cartu D, Garofil D, Tigora A, Zurzu M, et al. Open and Laparoscopic Surgical Approache in Incisional Hernias: A Descriptive Analysis. 2023;118(6):654-65.
44. Miholjic TB, Baud O, Iranmanesh P, Wildhaber BE. Risk Factors for Dehiscence of Operative Incisions in Newborns after Laparotomy. European Journal of Pediatric Surgery. 2024;34(04):351-62.
45. Habeeb TA, Hussain A, Shelat V, Chiaretti M, Bueno-Lledó J, García Fadrique A, et al. A prospective multicentre study evaluating the outcomes of the abdominal wall dehiscence repair using posterior component separation with transversus abdominis muscle release reinforced by a retro-muscular mesh: filling a step. 2023;18(1):15.
46. Sandy-Hodgetts K, Alves P, Conway B, Djohan R, Idensohn P, McIsaac C, et al. Optimising prevention of surgical wound complications: Detection, diagnosis and prediction. 2022.
47. Lockwood W. Wound Management Comprehensive. 2023.
48. Collins O. THE ROLE OF THE NURSE ON THE MANAGEMENT OF WOUNDS AND PRESSURE ULCERS: Ternopil; 2021.
49. Malone M, Schultz GJBJoD. Challenges in the diagnosis and management of wound infection. 2022;187(2):159-66.
50. Alam W, Hasson J, Reed MJJotAGS. Clinical approach to chronic wound management in older adults. 2021;69(8):2327-34.
51. Mitchell A, Llumigusin DJBJoN. The assessment and management of hypergranulation. 2021;30(5):S6-S10.
52. Veresciac E. MANAGEMENT AND TREATMENT OF VARIOUS SURGICAL WOUNDS (WOUND MANAGEMENT AND SURGICAL WOUND TREATMENT): Ternopil; 2022.
53. Dissemond J, Romanelli MJBJoD. Inflammatory skin diseases and wounds. 2022;187(2):167-77.

54. Lin Y-H, Chen Y-C, Cheng K-S, Yu P-J, Wang J-L, Ko N-YJJoCM. Higher periwound temperature associated with wound healing of pressure ulcers detected by infrared thermography. 2021;10(13):2883.
55. Patil SB, Gupta N, Kadakia K, Bhasin M, Gandhi A, Patil SSJJoSAFoO, et al. Post Cesarean Section Abdominal Wound Dehiscence: From Plastic Surgeon's Perspective. 2024;16(4):412-6.
56. Segar JL, Chock VY, Harer MW, Selewski DT, Askenazi DJ, Guidelines NBS, et al., editors. Fluid management, electrolytes imbalance and renal management in neonates with neonatal encephalopathy treated with hypothermia. *Seminars in Fetal and Neonatal Medicine*; 2021: Elsevier.
57. Davey S, Rajaretnem N, Harji D, Rees J, Messenger D, Smart N, et al. Incisional hernia formation in hepatobiliary surgery using transverse and hybrid incisions: a systematic review and meta-analysis. 2020;102(9):663-71.
58. Xu X, Zhou Y, Huang Y, Le Q, Lin L, Yu ZJJoWO, et al. Nursing Management of Abdominal Wound Dehiscence of an Infant With Severe Undernutrition and Peristomal Moisture-Associated Dermatitis After Ileostomy Closure: A Case Study. 2023;50(4):331-6.
59. Hardy G, Wong T, Morrissey H, Anderson C, Moltu SJ, Poindexter B, et al. Parenteral provision of micronutrients to pediatric patients: an international expert consensus paper. 2020;44:S5-S23.
60. Phelps S, Smith W, Smith T, Benton B, Rybolt M, White T, et al. Using the dehisced surgical wounds aetiology-specific TIME clinical decision support tool to promote consistent holistic wound management and eliminate variation in practice. 2021;4:38-45.
61. Donnelly J, Collins AJO, Care TNAEbAtM. Wound management, tissue viability and infection. 2023:140-56.
62. McCaughan D, Sheard L, Cullum N, Dumville J, Chetter IJJocn. Nurses' and surgeons' views and experiences of surgical wounds healing by secondary intention: A qualitative study. 2020;29(13-14):2557-71.
63. Boersema GC, Smart H, Giaquinto-Cilliers M, Mulder M, Weir GR, Bruwer FA, et al. Management of non-healable and maintenance wounds: a systematic integrative review and referral pathway. 2021;14(1):8-17.
64. Drossman DA, Chang L, Deutsch JK, Ford AC, Halpert A, Kroenke K, et al. A review of the evidence and recommendations on communication skills and the patient-provider relationship: a Rome foundation working team report. 2021;161(5):1670-88. e7.
65. Duane TM, Huston JM, Collom M, Beyer A, Parli S, Buckman S, et al. Surgical Infection Society 2020 updated guidelines on the management of complicated skin and soft tissue infections. 2021;22(4):383-99.
66. Atkinson TJ, Fudin JJPM, Clinics R. Nonsteroidal antiinflammatory drugs for acute and chronic pain. 2020;31(2):219-31.
67. Falcone M, De Angelis B, Pea F, Scalise A, Stefani S, Tasinato R, et al. Challenges in the management of chronic wound infections. 2021;26:140-7.
68. Gushiken LFS, Beserra FP, Bastos JK, Jackson CJ, Pellizzon CHJL. Cutaneous wound healing: An update from physiopathology to current therapies. 2021;11(7):665.
69. Bottosso S, Pasquali S, Ricci R, Arnež ZM. Surgical Debridement in Wound Care. *Pearls and Pitfalls in Skin Ulcer Management*: Springer; 2024. p. 429-37.
70. Horch RE, Ludolph I, Müller-Seubert W, Zetzmann K, Hauck T, Arkudas A, et al. Topical negative-pressure wound therapy: emerging devices and techniques. 2020;17(2):139-48.
71. Okeahialam NA, Thakar R, Sultan AHJEJoO, Gynecology, Biology R. The clinical progression and wound healing rate of dehisced perineal tears healing by secondary intention: A prospective observational study. 2022;274:191-6.