



Optimizing Intraoperative Hypothermia Management: A Case Study on Laparotomy for Adhesiolysis and Jejunal Diverticulectomy

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ABSTRACT

Exploratory laparotomy surgery is a procedure that is often found in patients with adhesive obstruction ileus. In the intraoperative phase, exploratory laparotomy takes a long time and exposure to cold environments and anesthetic drugs often causes hypothermia which has an impact on serious complications. The purpose of this study was to analyze intraoperative hypothermia management interventions in patients undergoing exploratory laparotomy surgery with adhesiolysis and jejunal diverticulectomy. The study design used a case study with a nursing care approach. The research sample is patient with a diagnosis of adhesive obstruction ileus taken using the convenience sampling technique. Data collection was carried out by observation during surgery and documentation studies with a perioperative nursing care format. Hypothermia management was carried out by providing warm irrigation interventions of the gastrointestinal organs with 0.9% NaCl fluid at a temperature of 38°C and laparotomy gauze when starting exploration for 4 hours according to the duration of surgery. The results of the study showed significant clinical improvements in body temperature, skin, blood pressure, pulse and gastrointestinal motility. The irrigation method with warm NaCl 0.9% during exploratory laparotomy is very effective in overcoming intraoperative hypothermia and facilitating the adhesiolysis process in the gastrointestinal organs.

Keywords: Hypothermia, Exploratory Laparotomy, Warm Irrigation, Intraoperative

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1. INTRODUCTION

Exploratory laparotomy is a surgical procedure that causes many complications (Tong et al., 2020). Obstructive ileus with adhesions is the most common reason for patients to undergo exploratory

laparotomy because it requires adhesiolysis to bowel resection (Broek et al., 2018). Risk factors for laparotomy procedures are extensively reviewed in the literature related to patients and surgical procedures. Surgery that takes a long time can cause

exposure to microorganisms and hypothermia (Mueller et al., 2024). Temperature problems in patients during surgical procedures are often ignored until they cause hypothermia. Hypothermia if left untreated can cause many complications such as postoperative wound infections, fluctuations in vital signs, pharmacodynamic changes in the drugs given, and increased treatment costs (Dai et al., 2022).

Hypothermia is often found during surgery due to convection and radiation processes that cause 85% of patients to experience heat loss (Collins et al., 2019). The prevalence of intraoperative hypothermia is often found in digestive surgery, with a prevalence of 51.85%, followed by gynecological surgery, with a prevalence of 29.63% (Pereira & De Mattia, 2019). A study by Xu et al. (2020) also found that intraoperative hypothermia was found in distal gastrectomy operations at a percentage of 54% and gastroenterology operations at 37%. Many factors cause intraoperative hypothermia, such as exposure to cold environments and the influence of anesthetic drugs, administration of blood products, inhalation of cold gas, and open wound cavities (Rauch et al., 2021).

Nursing problems that are often found in the intraoperative phase are

hypothermia. This phenomenon occurs when the core blood temperature drops below 36°C, and it has been a surgical complication in several studies. This condition occurs after induction of anesthesia, pharmacological agents that induce decreased metabolism, type of surgery, and duration of surgery (Ribeiro et al., 2021). Laparotomy surgery by opening the abdominal cavity for more than 2 hours also has the potential to increase the occurrence of hypothermia. Hypothermia management is needed to prevent complications in the intraoperative phase (Schwanda et al., 2024). Warm normal saline fluids can be given to patients intraoperatively. Normal saline with a temperature of 38°C prevents hypothermia and increases core body temperature by 5°C (Zaman et al., 2018). Thus, surgical nurses must be able to identify the risk of hypothermia in the intraoperative phase to prevent patient morbidity and mortality during surgical procedures (Ribeiro et al., 2021).

From the assessment data on patients with exploratory laparotomy and jejunal diverticulectomy on August 30, 2024, it was obtained that the patient underwent general anesthesia, the duration of surgery was 4 hours, the skin felt cold, Vital signs of blood pressure were 132/87 mmHg, Pulse 99 bpm, respiration 18

bpm, SpO₂ 99%, body temperature 35.5°C. Based on these data, the main nursing problem that was established was hypothermia. Based on these problems, the researcher conducted hypothermia management interventions in the intraoperative phase to determine the therapeutic effects on patients.

2. METHODS

This study is a case study with a nursing care process approach. The research sample was a patient taken using a convenience sampling technique. Data was collected during the intraoperative stage using the observation method and the intraoperative nursing care documentation study. This study was conducted at Tangerang Private Hospital. The intraoperative nursing process begins at the sign-in, time out to sign-out phase, which includes assessment, enforcement of priority nursing diagnoses, nursing interventions, and nursing implementation by managing hypothermia which is carried out during the intraoperative phase with irrigation of gastrointestinal organs with 0.9% NaCl fluid with a temperature of 38°C and laparotomy gauge when starting exploration for 4 hours according to the duration of surgery. The achievement of implementation results is evaluated with

the Indonesian nursing outcome standard guidelines.

3. RESULTS

The results of nursing care for intraoperative patients with exploratory laparotomy and jejunal diverticulectomy obtained patient assessment data with general anesthesia, 4 hours of surgery, cold skin, and body temperature 35.5°C. The priority nursing diagnosis of the case is Hypothermia (D.0131) related to exposure to low environmental temperatures.

The interventions carried out on patients are hypothermia management during the intraoperative phase, which includes observation and therapeutic. The observation intervention plan is to identify the cause of hypothermia and monitor signs and symptoms due to hypothermia. The therapeutic plan is carried out by providing a warmer, 0.9% warm NaCl irrigation with a temperature of 38°C in the abdominal cavity and gastrointestinal organs during surgery.

The nursing outcomes in this study are related to thermoregulation achieved during surgery. Nursing outcomes are evaluated based on actions carried out in the intraoperative phase. The following are the criteria for nursing outcomes and evaluations in patients:

Table 1. Priority Nursing Outcomes and Evaluation with Hypothermia Problems in the Intraoperative Phase

Out come	Before Intervention	After Intervention
Body temperature	35.5°C	36.7°C
Skin temperature	Cold	Warm
Blood Pressure	132/87 mmHg	123/89mmHg
Pulse	99 bpm	76 bpm
Motility disorders	Decreased (No intestinal motility on exploration)	Increased (Presence of intestinal motility on exploration)

Table 1 shows the results of nursing interventions during the exploratory laparotomy operation. The nursing evaluation was carried out after implementing warm compresses with gastrointestinal organs with warm 0.9% NaCl. There was a change in clinical conditions that were better in body temperature, blood pressure, pulse, and gastrointestinal motility.

4. DISCUSSION

During the assessment, patient data was obtained that the patient's skin felt cold due to exposure to the operating room, body temperature 35.5°C, blood pressure 132/87 mmHg, pulse 99 bpm, and decreased intestinal motility. During the intraoperative procedure, complications that patients often experience are hypothermia due to several factors, such as anesthetic drugs, operating room temperature to fluids, or blood products (Xu et al., 2020). The results of the study found that hypothermia in intraoperative patients can change the pharmacokinetics

of drugs and interfere with enzyme activity, thereby reducing metabolism and prolonging the action of anesthetic drugs, as a result of which the patient experiences delayed recovery from anesthesia. A decreased core body temperature during the preoperative phase also impacts the patient's vital signs (Rauch et al., 2021). Failure in intraoperative hypothermia management results in postoperative complications such as decreased erythrocytes, mortality, coagulopathy, changes in drug metabolism, delayed recovery, length of hospital stay, incidence of cardiac arrhythmias, decubitus ulcers, and surgical site infections (Peixoto et al., 2021). So, the signs and symptoms during intraoperative assessment are based on current theories and research.

In intraoperatively, the priority nursing diagnosis found during exploratory laparotomy is hypothermia. The signs and symptoms of hypothermia in patients are cold skin, shivering, and a temperature of 35.5°C. Based on the Indonesian nursing diagnosis standards,

the significant data found in the diagnosis of hypothermia are cold skin, shivering, and temperature below typical values (PPNI, 2017). In exploratory laparotomy patients, nursing problems with the risk of bleeding were also found with signs and symptoms of intraoperative bleeding of 400 ml. The risk of bleeding can occur due to incisions in the abdominal area, poor bleeding control, and factors that cause patient coagulability disorders (Sleiman et al., 2020). Shah et al. (2020) added that the mechanisms that contribute to intraoperative bleeding are complex, including pre-existing comorbidities such as the type of surgical procedure, activation of fibrinolytic and inflammatory pathways, hemostatic disorders, consumption of anticoagulants and antiplatelets, hypothermia and acidosis.

In this case, nursing intervention based on the Indonesian nursing intervention standards is hypothermia management. Hypothermia management is carried out by observation (monitoring body temperature, identifying the cause of hypothermia, and monitoring the impact of hypothermia) and observation (providing warmers, changing wet linen, performing internal warming with 0.9% NaCl irrigation). Hypothermia is often found in patients due to cold environmental conditions. Hypothermia management is

carried out to prevent complications during surgical procedures. Based on Indonesian nursing outcome standards, the criteria for hypothermia outcomes include decreased shivering, improved skin temperature, and body temperature within normal limits. Hypothermia is characterized by a widespread decrease in metabolism that affects all body systems simultaneously. The consequences are significant physiological changes, including changes in heart function, fluctuations in the state of consciousness, shivering, and prolonged plasma half-life of drugs, which can also increase oxygen consumption by up to 500 percent.

Exploratory laparotomy, in this case, found adhesions and perforated diverticulitis in the jejunum. Then, adhesiolysis and diverticulectomy were performed on the proximal jejunum. In cases of obstructive ileus, it is mainly caused by adhesions, and the most common mechanism is fibrous bands; a history of surgery also contributes the most to adhesions (Ghimire & Maharjan, 2023). In addition, adhesion cases are also caused by abnormal inflammatory factors in the intestinal tract, such as diverticulitis. Jejunal diverticula are usually mainly in the mesenteric small intestine and are often found in the proximal jejunum with a decreasing incidence towards the ileocecal

valve (De Simone et al., 2019). Surgery is performed on patients with ischemia, strangulation perforation, peritonitis, and failure of nonoperative treatment. Midline laparotomy with adhesiolysis is the standard that must be performed, but this has a greater risk of infection and adhesions in the future (Tong et al., 2020). Adhesiolysis may be difficult in cases of diffuse adhesions, and almost 60% of operations experience bowel injury, so resection is required in addition to the tendency for more anatomical leaks (Sakari et al., 2020). Diverticulectomy is necessary to prevent jejunal leakage and perforation of the peritoneum (Lebert et al., 2018).

Good hypothermia management can reduce intraoperative complications. Warm irrigation with 0.9% NaCl in the gastrointestinal tract during exploratory laparotomy is an intervention that surgical nurses can perform. The use of warm 0.9% NaCl, in addition to cleaning the abdominal cavity, also prevents heat loss during surgical procedures (Patola & Tridiyawati, 2024). Based on research, Simegn et al. (2021) revealed that using warm fluids during laparotomy can increase the core temperature by 1.3°C and prevent heat loss through conduction. Warm 0.9% NaCl at a temperature of 30-50°C is highly recommended because it can reduce adhesions during laparotomy and

prevent bacterial colonization and infectious complications (Simegn et al., 2021). In adhesions, warm 0.9% NaCl irrigation can prevent adhesions so operators can more easily explore and reduce intraoperative time (Kovachev, 2019). Physiologically, 0.9% NaCl solution can reduce fibrinolytic capacity and induce a decrease in mesothelium so that it can eliminate residual blood, residual tissue fragments, and other fluids, thereby avoiding complications in the form of adhesions (Syahputra et al., 2020).

5. CONCLUSION

The results of the case study of intraoperative nursing care with exploratory laparotomy and jejunal diverticulectomy are hypothermia. Hypothermia management intervention in the form of intraperitoneal irrigation with 0.9% warm NaCl at 38°C can prevent hypothermia and complications. Warm irrigation with 0.9% NaCl can increase the patient's core body temperature and improve the patient's vital signs. During the surgical process, this intervention is also valuable in preventing adhesions, making it easier to explore and reduce the duration of surgery. Surgical nurses are expected to be able to apply warm irrigation with 0.9% NaCl in all laparotomy cases so that it can prevent

complications during intra and post-operatively.

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AUTHOR CONTRIBUTIONS

Substantial contribution to conception, data collection, analysis, writing manuscript and revision: Muhammad Alfarizi.

CONFLICT OF INTEREST

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

DATA AVAILABILITY STATEMENT

The data are not publicly available due to privacy or ethical restrictions.

REFERENCES

Abdelbasset, W., & Elnegamy, T. (2015). Effect of Chest Physical Therapy on Pediatrics Hospitalized With Pneumonia. *International Journal of Health and Rehabilitation Sciences (IJHRS)*, 4(4), 219.

AbdelHalim, H. A., AboElNaga, H. H., & Fathy, K. A. (2016). Comparison between active cycles of breathing with postural drainage versus conventional chest physiotherapy in subjects with bronchiectasis. *Egyptian Journal of Chest Diseases and Tuberculosis*, 65(1), 157–165. <https://doi.org/10.1016/j.ejcdt.2015.08.006>

Aminasty Siregar, D. (2020). Faktor-Faktor Yang Berhubungan Dengan Kejadian Pneumonia Pada Balita Rumah Sakit Umum Daerah (RSUD) Kota Padangsidempuan Tahun 2020. *Ilmiah Kohesi*, 4(2), 31–42. <https://kohesi.sciencemakarioz.org/index.php/JIK/article/view/122>

Andrade, L. Z. C., Da Silva, V. M., Lopes, M. V. D. O., Chaves, D. B. R., & Távora, R. C. D. O. (2014). Desobstrução ineficaz de vias aéreas: Prevalência e espectro de seus indicadores clínicos. *ACTA Paulista de Enfermagem*, 27(4), 319–325. <https://doi.org/10.1590/1982-0194201400054>

- Belli, S., Prince, I., Savio, G., Paracchini, E., Cattaneo, D., Bianchi, M., Masocco, F., Bellanti, M. T., & Balbi, B. (2021). Airway Clearance Techniques: The Right Choice for the Right Patient. *Frontiers in Medicine*, 8(February), 1–10. <https://doi.org/10.3389/fmed.2021.544826>
- Broek, R. P. G., Krielen, P., Di Saverio, S., Coccolini, F., Biffi, W. L., Ansaloni, L., Velmahos, G. C., Sartelli, M., Fraga, G. P., Kelly, M. D., Moore, F. A., Peitzman, A. B., Leppaniemi, A., Moore, E. E., Jeekel, J., Kluger, Y., Sugrue, M., Balogh, Z. J., Bendinelli, C., ... van Goor, H. (2018). Bologna guidelines for diagnosis and management of adhesive small bowel obstruction (ASBO). *World Journal of Emergency Surgery*, 13(1), 13–24. <https://doi.org/10.1186/s13017-018-0185-2>
- Chaves, D. B. R., Beltrão, B. A., Pascoal, L. M., Oliveira, A. R. de S., Andrade, L. Z. C., dos Santos, A. C. B., de Moura, K. K. M., Lopes, M. V. de O., & da Silva, V. M. (2016). Defining characteristics of the nursing diagnosis “ineffective airway clearance.” *Revista Brasileira de Enfermagem*, 69(1), 92–98. <https://doi.org/10.1590/0034-7167.2016690114i>
- Chaves, G. S. S., Freitas, D. A., Santino, T. A., Nogueira, P. A. M. S., Fregonezi, G. A. F., & Mendonça, K. M. P. P. (2019). Chest physiotherapy for pneumonia in children. *Cochrane Database of Systematic Reviews*, 2019(1). <https://doi.org/10.1002/14651858.CD010277.pub3>
- Collins, S., Budds, M., Raines, C., & Hooper, V. (2019). Risk Factors for Perioperative Hypothermia: A Literature Review. *Journal of Perianesthesia Nursing*, 34(2), 338–346. <https://doi.org/10.1016/j.jopan.2018.06.003>
- Corten, L., Jelsma, J., & Morrow, B. M. (2015). Chest physiotherapy in children with acute bacterial pneumonia. *South African Journal of Physiotherapy*, 71(1), 1–10. <https://doi.org/10.4102/sajp.v71i1.256>
- Dai, Z., Zhang, Y., Yi, J., & Huang, Y. (2022). Validation of a Prediction Model for Intraoperative Hypothermia in Patients Receiving

- General Anesthesia. *International Journal of Clinical Practice*, 2022. <https://doi.org/10.1155/2022/6806225>
- De Simone, B., Alberici, L., Ansaloni, L., Sartelli, M., Coccolini, F., & Catena, F. (2019). Not all diverticulites are colonic: Small bowel diverticulitis – A systematic review. *Minerva Chirurgica*, 74(2), 137–145. <https://doi.org/10.23736/S0026-4733.18.07745-3>
- Efni, Y., Machmud, R., & Pertiwi, D. (2016). Faktor Risiko yang Berhubungan dengan Kejadian Pneumonia pada Balita di Kelurahan Air Tawar Barat Padang. *Jurnal Kesehatan Andalas*, 5(2), 365–370. <https://doi.org/10.25077/jka.v5i2.523>
- Fikri, B. A. (2017). Analisis Faktor Risiko Pemberian Asi Dan Ventilasi Kamar Terhadap Kejadian Pneumonia Balita. *The Indonesian Journal of Public Health*, 11(1), 14. <https://doi.org/10.20473/ijph.v11i1.2016.14-27>
- Ghimire, P., & Maharjan, S. (2023). Adhesive Small Bowel Obstruction: A Review. *Journal of the Nepal Medical Association*, 61(260), 390–396. <https://doi.org/10.31729/jnma.8134>
- Gomes, G. R., & Donadio, M. V. F. (2018). Effects of the use of respiratory physiotherapy in children admitted with acute viral bronchiolitis. *Archives de Pediatrie*, 25(6), 394–398. <https://doi.org/10.1016/j.arcped.2018.06.004>
- Hartati, S., Nurhaeni, N., & Gayatri, D. (2012). Faktor Risiko Terjadinya Pneumonia pada Anak Balita. *Jurnal Keperawatan Indonesia*, 15(1), 13–20. <https://doi.org/10.7454/jki.v15i1.42>
- Kovachev, L. (2019). Simple , Easy and Accessible Way for Abdominal Adhesions Separation. *Austin Journal of Surgery*, 6(16), 6–7. <https://austinpublishinggroup.com/surgery/fulltext/ajs-v6-id1202.pdf>
- Lebert, P., Millet, I., Ernst, O., Boulay-Coletta, I., Corno, L., Taourel, P., & Zins, M. (2018). Acute Jejunoileal Diverticulitis: Multicenter Descriptive Study of 33 Patients. *AJR. American journal of roentgenology*, 210(6), 1245–1251. <https://doi.org/10.2214/AJR.17.18777>

- Mueller, T. C., Kehl, V., Dimpel, R., Blankenstein, C., Egert-Schwender, S., Strudthoff, J., Lock, J. F., Wiegering, A., Hadian, A., Lang, H., Albertsmeier, M., Neuberger, M., Von Ehrlich-Treuenstätt, V., Mihaljevic, A. L., Knebel, P., Pianka, F., Braumann, C., Uhl, W., Bouchard, R., ... Reim, D. (2024). Intraoperative Wound Irrigation for the Prevention of Surgical Site Infection after Laparotomy: A Randomized Clinical Trial by CHIR-Net. *JAMA Surgery*, 159(5), 484–492. <https://doi.org/10.1001/jamasurg.2023.7985>
- Navaratnam, V., Forrester, D. L., Eg, K. P., & Chang, A. B. (2019). Paediatric and adult bronchiectasis: Monitoring, cross-infection, role of multidisciplinary teams and self-management plans. *Respirology*, 24(2), 115–126. <https://doi.org/10.1111/resp.13451>
- Pascoal, L. M., Lopes, M. V. de O., Silva, V. M. da, Chaves, D. B. R., Beltrão, B. A., Nunes, M. M., & de Castro, N. B. (2020). Prognostic indicators of short-term survival of ineffective airway clearance in children with acute respiratory infection: a longitudinal study. *Contemporary Nurse*, 56(4), 376–387. <https://doi.org/10.1080/10376178.2020.1813045>
- Patola, A., & Tridiyawati, F. (2024). Managing Hypothermia in Emergency Exploratory Laparotomy: A Case Report. *Jurnal Keperawatan Komprehensif*, 10(April), 203–211.
- Peixoto, C. de A., Ferreira, M. B. G., dos Santos Felix, M. M., Pereira, C. B. de M., Cândido, J. V., Rocha, V. F. R., Ferreira, L. A., & Barbosa, M. H. (2021). Factors contributing to intraoperative hypothermia in patients undergoing elective surgery. *Perioperative Care and Operating Room Management*, 22(December 2020). <https://doi.org/10.1016/j.pcorm.2020.100150>
- Pereira, N. H. C., & De Mattia, A. L. (2019). Postoperative complications related to intraoperative hypothermia. *Enfermeria Global*, 18(3), 270–284. <https://doi.org/10.6018/eglobal.18.3.328791>
- Phillips, J., Lee, A., Pope, R., & Hing, W. (2020). Effect of airway clearance techniques in patients experiencing

- an acute exacerbation of bronchiectasis: a systematic review. *Physiotherapy Theory and Practice*, 36(12), 1300–1315. <https://doi.org/10.1080/09593985.2019.1579286>
- Potter, P., & Perry, A. (2016). *Fundamental Keperawatan Edisi 7 Buku 3* (3rd ed.). Salemba Medika.
- PPNI. (2017). *Standar Diagnosis Keperawatan Indonesia: Definisi dan Indikator Diagnostik*. Dewan Pengurus Pusat PPNI.
- PPNI. (2018a). *Standar Intervensi Keperawatan Indonesia*. Dewan Pengurus Pusat PPNI.
- PPNI. (2018b). *Standar Luaran keperawatan Indonesia*. Dewan Pengurus Pusat PPNI.
- Rauch, S., Miller, C., Bräuer, A., Wallner, B., Bock, M., & Paal, P. (2021). Perioperative Hypothermia A Narrative Review. *International Journal of Environmental Research and Public Health*. <https://doi.org/10.3390/ijerph18168749>
- Ribeiro, E., Ferreira, R. C., Montanari, F. L., Botelho, M. T. de S. L., Correia, M. D. L., & Duran, E. C. M. (2021). Conceptual and operational definition of the components of the nursing diagnosis hypothermia (00006) in the perioperative period. *Revista Brasileira de Enfermagem*, 74(2), 1–9. <https://doi.org/10.1590/0034-7167-2019-0684>
- Rigustia, R., Zeffira, L., & Vani, A. T. (2019). Faktor Risiko yang Berhubungan dengan Kejadian Pneumonia pada Balita di Puskesmas Ikur Koto Kota Padang. *Health & Medical Journal*, 1(1), 22–29. <https://doi.org/10.33854/heme.v1i1.215>
- Sakari, T., Christersson, M., & Karlbom, U. (2020). Mechanisms of adhesive small bowel obstruction and outcome of surgery; A population-based study. *BMC Surgery*, 20(1), 1–8. <https://doi.org/10.1186/s12893-020-00724-9>
- Schwanda, M., Brunner, S., Almeida, M. de A., Koller, M., Staub, M. M., & Ewers, A. (2024). Content validation of the NANDA-I nursing diagnosis risk for

- perioperative.pdf. International Journal of Nursing Knowledge, 1–12. <https://doi.org/10.1111/2047-3095.12491>
- Simegn, G. D., Bayable, S. D., & Fetene, M. B. (2021). Prevention and management of perioperative hypothermia in adult elective surgical patients: A systematic review. *Annals of Medicine and Surgery*, 72(October), 103059. <https://doi.org/10.1016/j.amsu.2021.103059>
- Sleiman, Z., Baba, R., Garzon, S., & Khazaka, A. (2020). The significant risk factors of intra-operative hemorrhage during laparoscopic myomectomy: A systematic review. *Gynecology and Minimally Invasive Therapy*, 9(1), 6–12. https://doi.org/10.4103/GMIT.GMIT_21_19
- Sutriana, V. N., Sitaresmi, M. N., & Wahab, A. (2021). Risk factors for childhood pneumonia: a case-control study in a high prevalence area in Indonesia. *Clinical and Experimental Pediatrics*, 64(11), 588–595. <https://doi.org/10.3345/CEP.2020.00339>
- Syahputra, D. A., Mashudy, A., & Dasrul. (2020). The effect of addition of dexamethasone into normal saline irrigation solution on Prevention of Intraperitoneal Adhesion Post Laparotomy in wistar rats (*Rattus norvegicus*). *Annals of Medicine and Surgery*, 59(441), 57–63. <https://doi.org/10.1016/j.amsu.2020.08.053>
- Tong, J. W. V., Lingam, P., & Shelat, V. G. (2020). Adhesive small bowel obstruction – an update. *Acute Medicine & Surgery*, 7(1). <https://doi.org/10.1002/ams2.587>
- Valji, R., Mehta, R., & Hicks, A. (2021). Re: Effectiveness of hypertonic saline nebulization in airway clearance in children with noncystic fibrosis bronchiectasis: A randomized control trial. *Pediatric Pulmonology*, 56(12), 4051–4052. <https://doi.org/10.1002/ppul.25656>
- Xu, H., Wang, Z., Guan, X., Lu, Y., Malone, D. C., Salmon, J. W., Ma, A., & Tang, W. (2020). Safety of intraoperative hypothermia for patients: Meta-analyses of randomized controlled trials and observational studies. *BMC Anesthesiology*, 20(1), 1–13.

<https://doi.org/10.1186/s12871-020-01065-z>

Yoshimura, S., Okata, Y., Samejima, Y., Miyauchi, H., Saito, M., Inoue, S., Fujioka, K., Iwabuchi, S., Kameoka, Y., Watanabe, A., Uemura, K., Tomioka, Y., & Bitoh, Y. (2023). Impact of peritoneal lavage temperature during laparotomy in a preterm peritonitis mouse model using cecal slurry. *Journal of Pediatric Surgery Open*, 2(February), 100016.

<https://doi.org/10.1016/j.yjpso.2023.100016>

Yuliastati, & Arnis, A. (2016). Keperawatan Anak. *Pusdik SDM Kesehatan*, 1, 27–37. <https://repository.stikesbcm.ac.id/id/eprint/429/>

Zaman, S. S., Rahmani, F., Majedi, M. A., Roshani, D., & Valiee, S. (2018). A Clinical Trial of the Effect of Warm Intravenous Fluids on Core Temperature and Shivering in Patients Undergoing Abdominal Surgery. *Journal of Perianesthesia Nursing*, 33(5), 616–625. <https://doi.org/10.1016/j.jopan.2016.12.010>