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Staged Procedure with Temporary Abdominal Closure in Gynaecologic-Oncology Patients in Prevention of Abdominal Compartment Syndrome: A Lesson to be Learnt

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Abstract

Abdominal Compartment Syndrome (ACS) is a medical emergency-characterized by organ dysfunction which is caused by intra-abdominal hypertension. Clinical signs are often non-specific and it is associated with high rate of mortality and morbidity when it is not recognized and managed promptly. Although ACS has not been commonly observed in gynaecological patients, it remains a potential risk especially in gynaecologic-oncology patients – many of whom will require extensive debulking surgery. Through the two cases discussed, we hope to raise awareness of ACS. This will hopefully aid in better identification of patients who are at high risk of developing ACS, such that risk reduction measures may be employed peri-operatively, as well as earlier recognition and intervention, thus reducing risk of associated morbidities and mortality.

Introduction

As defined by The World Society of the Abdominal Compartment Syndrome (WSACS), Intra-Abdominal Hypertension (IAH) is a sustained or repeated pathological elevation in intra-abdominal pressure (IAP) ≥12mmHg. Abdominal Compartment Syndrome (ACS) is defined as a sustained IAP >20mmHg which is associated with new organ dysfunction [1]. Clinical signs are often non-specific but may include abdominal distension and rigidity, tachypnoea, loss of diaphragmatic movements, hypotension, tachycardia, and reduced urine output. ACS is associated with high rate of mortality and morbidity when it is not recognized and managed promptly. It is typically seen in patients who are critically ill, and there should be high clinical suspicion for ACS in patients with penetrating abdominal trauma or surgical patients after extensive abdominal surgery [2, 3].

In this series, we present two gynaecologic-oncology patients who underwent extensive debulking surgery and differences in their post-operative management.

Case I

62 years old woman with history of total hysterectomy presented with abdominal distension back in 2013. A Computed-Tomography (CT) scan showed two complex masses with peritoneal deposits in pelvis, abdomen and splenic hilum - suggestive

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of ovarian cancer. Patient opted for primary debulking surgery. Intra-operative finding was that of bilateral ovarian tumours which were densely adherent to transverse colon, sigmoid and bladder, and extensive peritoneal disease. An omental biopsy was performed and sent for frozen section, which returned as high-grade serous carcinoma. In view of the intra-operative findings and frozen section results, decision was madeto not proceed further with primary debulkingsurgery, and for neoadjuvant chemotherapy instead. Final histology returned as low-grade serous subtype. She was given three cycles of Paclitaxel and Carboplatin and a repeat CT scan showed stable disease with no response to chemotherapy. She declined further chemotherapy, had a second opinion in another institution and was given the same advice. Despite that, she still declined chemotherapy and defaulted follow-up. She subsequently represented in 2017 when a Positron Emission Tomography and Computed-Tomography (PET-CT) performed again showed bilateral ovarian tumours with extensive peritoneal disease and bilateral hydronephrosis. Following Multi-Disciplinary Team (MDT) discussion at a surgical oncology tumour board, decision was made for cytoreductive surgery with the both gynaecological and surgical oncologists in view of limited role for chemotherapy given the histological subtype and previous lack of response.

Intra-operatively, there was bilateral ovarian masses with extensive peritoneal disease involving the small and large bowels, and the spleen. It was an extensive surgery involving adhesiolysis, bilateral salpingo-oophorectomy, bowel resection, gastrectomy and splenectomy, with an estimated blood loss of 5 litres, with increasing requirements forinotropic support. Thus, decision was made for temporary closure with staged procedure following stabilization.

Two days later, she had further debulkingof the remaining peritoneal disease and bowel anastomosis. A few hours post-operatively, patient became hypotensive and tachycardic. The initial clinical impression was that of hypovolaemia. However, an attempt at resuscitation with both crystalloid and colloid yielded minimal response. An Arterial Blood Gas (ABG) revealed a Haemoglobin (Hb) of 9.1g/dL (from 12.3g/dL) and metabolic acidosis. However, as abdominal drain output remained stable, intra-abdominal bleeding was thought to be unlikely. Resuscitation continued with further volume replacement and blood products. Despite that, she had increasing inotropes requirement and went into cardiac arrest with Pulseless Electrical Activity (PEA) approximately 1.5 hours later. Return of spontaneous circulation was achieved within 4 minutes with Cardiopulmonary Resuscitation (CPR) and single dose of adrenaline. Blood tests revealed metabolic acidosis with renal and liver dysfunction. Overall findings were concerning for ACS and thus, decision was made for a relook laparotomy and surgical decompression.

Intra-operatively, bowels were oedematous and dusky, and liver appeared congested - consistent with a diagnosis of ACS. Following temporary abdominal closure, patient was transferred back to Surgical Intensive Care Unit (SICU) with close monitoring IAP, which gradually settled, and inotropes weaned off successfully. She required interim haemodialysis in view of acute kidney injury. Two days later, she underwent an exploratory laparotomy, bowels were much less oedematous and well-perfused and liver much less congested. The surgical team was able to achieve good approximation of the fascia and proceeded with primary abdominal closure. Post-operatively, patient remained stable with improvement in urine output and renal function. Unfortunately, she had a prolonged hospital stay due to Enterocutaneous Fistula (ECF) with wound breakdown requiring Total Parenteral Nutrition (TPN). She was discharged 3 months later after ECF resolved with conservative management.

This is a case of ACS with delayed recognition, leading to cardiac arrest. Fortunately, patient was successfully resuscitated and stabilized following decompressive surgery.

Case II

39 years old nulliparous woman, presented to the emergency department with abdominal pain and distension. CT scan revealed a large abdominopelvic mass, likely ovarian in origin, associated with extensive peritoneal and omental stranding. In addition, some air pockets were visualized amidst the mass lesion. CA-125 was markedly elevated at 3890U/mL. Overall, findings were suspicious for a primary ovarian malignancy with peritoneal metastases, possibly complicated by a contained small bowel perforation. She was admitted to SICU with septic shock. A family conference was held, she was initially advised to opt for best supportive care in view of high peri-operative mortality and morbidity – in view of extensive peritoneal disease with ongoing intra-abdominal septic shock. They sought for a second opinion in another institution, and was given the same recommendations. Subsequently, patient requested for transfer of care to our institution. Fluid cytology from a pleural drainage confirmed metastatic adenocarcinoma, consistent with a Mullerian primary. Following MDT discussion with anaesthetists and surgical oncologists – patient was counselled for staged cytoreductive surgery to reduce peri-operative risks. NACT was not an option in view of ongoing sepsis with suspected small bowel perforation which requires immediate surgical intervention. She subsequently underwent an exploratory laparotomy. Intra-operatively, the bowels were noted to be grossly dilated and oedematous, with two sites of small bowel perforation. There was also extensive peritoneal disease and tumours appear to be infected with copious amount of purulent fluid.She had a total hysterectomy, bilateral salpingo-oophorectomy, infracolicomentectomy, pelvic and bladder peritonectomy, right subdiaphragmaticperitonectomy, low anterior resection, limited right hemicolectomy and small bowel resection. The surgery was complicated by an estimated blood loss of 7.7 litres requiring massive transfusion, and inotropic support intra-operatively. In view of the above and the operative findings, decision was made for temporary abdominal closure and for a staged procedure following stabilization. Two days later, she had surgery to debulk the remaining peritoneal disease in the pelvis, bowel anastomosis and ileostomy creation. Bowels were still markedly oedematous, thus, decision was made for delayed abdominal closure as she was at high risk for ACS. Post-operatively, other active measures were also taken to further reduce the risk of ACS including endoluminaldecompression with both a Nasogastric Tube (NGT) and rectal tube and administration of diuretics to ensure negative fluid balance.

Three days later, patient was re-evaluated - bowels were significantly less oedematous, abdominal wall fascia and stoma appeared healthy. Therefore, decision was made for primary closure of the abdomen. Patient was closely monitored in SICU with hourly measurements of IAP and urine output, and biochemical markers such as arterial blood gas and lactate. Two hours post-operatively, IAP had increased to 30mmHg. However, patient remained clinically stable with good urine output. Thus, we continued with conservative management with paralysis of

patient. Following which, there was significant reduction in IAP to 18mmHg over the next hour. IAP continued to downtrend and patient remained well. Stoma started functioning well by post-operative day 6. She was weaned off TPN with gradual escalation in feeding and was discharged well two weeks later following completion of antibiotics and anti-fungal therapy.

This is a case of recognizing patient who was at risk of developing ACS and employing strategies pre-emptively-such as planned temporary closure, endoluminal decompression, and careful fluid management with diuretics -successfully preventing ACS.

Discussion

ACS is a condition associated with reported mortality rates of up to 50-60%. [4] Early recognition and treatment is of utmost importance. Many risk factors for ACS have been described [1]-including major trauma, abdominal surgery, gastroparesis, intra-abdominal infections and tumours, acidosis and massive fluid resuscitation or positive fluid balance. Intravesical pressure measurement remains the gold-standard recommended by WSACS.

De Laet et al., [5] suggest that there are three critical elements to consider in the management of IAH/ACS – the degree of IAP increase, the impact of increased IAP (i.e organ dysfunction) and the underlying etiology.

In addition to surgical decompression, there are several conservative measures that may be beneficial in management of IAH and ACS [1]. These include evacuation of intra-luminal contents, analgesia, and sedation to improve abdominal wall compliance, optimization of fluid administration to avoid excessive fluid resuscitation and maintaining zero to negative fluid balance. These were all strategies employed pre-emptively in our second case, successfully preventing development of ACS.

However, it is important to note that delays in performing surgical decompression is also associated with morbidity and mortality rates up to 88% [6] Thus, a patient who is symptomatic with signs of multi-organ involvement (as in our first case) should not be treated conservatively. Surgical decompression decreases IAP to stop organ dysfunction, allows for expansion of the abdominal viscera, provides temporary abdominal closure as the underlying disease process resolves, prevents excessive fascial retraction, and allows continued evacuation of fluid from the abdominal cavity.

One of the main learning points is the importance of early recognition of ACS to prevent associated organ dysfunction, thus improving patients' outcomes. For instance, the acute bowel ischaemia is the likely etiology for the development of ECF [7] in our first patient, resulting in slower recovery and prolonged hospitalization. In addition to the delayed diagnosis, the aggressive fluid resuscitation further aggravated her condition - resulting in the cardiac arrest.

Another learning point is to consider the Open Abdomen (OA) technique -which was the strategy employed in our second patient. Indications for OA include trauma, abdominal sepsis, ongoing IAH to prevent development of ACS, when primary fascial closure is not possible, or to facilitate re-laparotomy [8, 9]. However, OA is also associated with serious complications such as fluid losses and loss of abdominal domain secondary to fascial retraction. Thus, it should only be used in selected cases with the aim of early abdominal closure.

The WSACS guidelines [1] recommend utilization of Negative Pressure Wound Therapy (NPWT) for temporary abdominal closure as it prevents visceral adherence to the abdominal wall whilst maintaining medial fascial traction which may enhance fascial closure rates among those with OA. The timing of delayed abdominal fascial closure remains debatable but Miller et al [10] suggests that closure before 8 days was associated with few complications. WSACS recommends an early abdominal fascial closure or at least within the same admission. Scott et al [11] describes the window of opportunity for early closure-which opens when visceral organ oedema subside and closes when the peritoneal space between the abdominal wall and visceral organs become obliterated with granulation tissue-and discusses several strategies for management of the OA. One being the "sandwich" technique (first described by Barker et al in 1995) whereby the visceral sac is wrapped by polyethylene sheet, then covered with an absorptive layer and finally, an external layer of adhesive drape over the skin, with suction applied to drains placed in between the layers. The polyethylene sheet acts as a physical barrier, prevent adhesion formation between bowel and anterior abdominal wall, preserving the peritoneal space.

A similar technique was used for our second case, with the use of skin graft placed over the bowel to prevent injuries and adhesions to the anterior abdominal wall. It also helped to maintain the integrity of bowel, which appeared healthy with no adhesions noted during the repeat laparotomy.

In addition to early recognition and management of ACS, it is also important to reduce risk of ACS. One of the major risk factors in both cases discussed is the extensive abdominal surgeries performed. In gynaecologic-oncology patients, the extent of debulking surgery could potentially be reduced by NACT. Unfortunately, this was not an appropriate option in the cases discussed. The first patient had disease progression despite chemotherapy. NACT was not an option for our second patient given her presentation of extensive disease with small bowel perforation complicated by septic shock, necessitating early surgical intervention. Another risk-reducing measure could have been the consideration of a limited surgery. However, in view of her young age, the aim was to achieve optimal debulking.

Conclusion

ACS has not been commonly observed in gynaecological patients-with only a few cases reported to date [12, 13,14]. Through the cases reported, we hope to further raise awareness of this phenomenon, especially in gynaecologic-oncology patients- many of whom will require extensive debulking surgery.

Higher level of awareness amongst clinicians will aid in better identification of patients who are at high risk of ACS, so that risk reduction measures (e.g. NACT to reduce extent of debulking surgeries when appropriate) or pre-emptive conservative measures can be employed post-operatively as described in our second patient. Hopefully, it will also result in earlier recognition and intervention for patients who may be developing IAH/ACS, reducing risk of associated morbidities and mortality.

References

1. Kirkpatrick A, Roberts D, De Waele J, Jaeschke R, Malbrain M et al. Intra-abdominal hypertension and the abdominal compartment syndrome: updated consensus definitions and clinical practice guidelines from the World Society of the Abdominal Compartment Syndrome. Intensive Care Medicine. 2013; 39: 1190-1206.

2. Newman RK, Dayal N, Dominique E. Abdominal Compartment Syndrome. 2020 Jul 10. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2021.

3. Scheppach W. Abdominal compartment syndrome. Best Practice & Research Clinical Gastroenterology. 2009; 23: 25-33.

4. Carlotti A, Carvalho W. Abdominal compartment syndrome: A review. Pediatric Critical Care Medicine. 2009; 10: 115-120.

5. De Laet I, Malbrain M, De Waele J. A Clinician's Guide to Management of Intra-abdominal Hypertension and Abdominal Compartment Syndrome in Critically Ill Patients. Critical Care. 2020; 24.

6. Carr J. Abdominal Compartment Syndrome: A Decade of Progress. Journal of the American College of Surgeons. 2013; 216: 135-146.

7. Salman Khan M, Khan I, Humza A, Bashir Hadi Y, Haider Z. Enteroenteric Fistulae In Acute Bowel Ischemia. Journal of the College of Physicians and Surgeons Pakistan. 2018; 28: 568-571.

8. Coccolini F, Biffl W, Catena F, Ceresoli M, Chiara Oet al. The open abdomen, indications, management and definitive closure. World Journal of Emergency Surgery. 2015; 10.

9. Acosta S, Bjarnason T, Petersson U, Pålsson B, Wanhainen A et al. Multicentre prospective study of fascial closure rate after open abdomen with vacuum and mesh-mediated fascial traction. British Journal of Surgery. 2011; 98: 735-743.

10. Miller P, Thompson J, Faler B, Meredith J, Chang M. Late Fascial Closure in Lieu of Ventral Hernia: The Next Step in Open Abdomen Management. The Journal of Trauma: Injury, Infection, and Critical Care. 2002; 53: 843-849.

11. Scott B, Feanny M, Hirshberg A. Early Definitive Closure of the Open Abdomen: A Quiet Revolution. Scandinavian Journal of Surgery. 2005; 94: 9-14.

12. Sieloff E, Baumgartner M, Schauer M, Shattuck B. A Case of Lethal Abdominal Compartment Syndrome due to Rapidly Expanding Ovarian Small Cell Carcinoma Pulmonary Type. Cureus. 2020.

13. von Gruenigen VE, Coleman RL, King MR, Miller DS. Abdominal compartment syndrome in gynecologic surgery. Obstetrics & Gynecology. 1999; 94: 830-832.

14. Comert G, Unlubilgin E, Ucar Z, Turkmen O, Karalok A, et al. Raising Awareness of Abdominal Compartment Syndrome after Gynecologic-Oncology Surgery. Gazi Medical Journal. 2016; 27: 3.