

I don't want you to be only
a doctor but I also want you
to be a man

A quotation by His Royal Highness Prince Charles of Wales

The Clinical Academia

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We are the former Khon Kaen Medical Journal

We are about to be 40 years old.

Our next issue

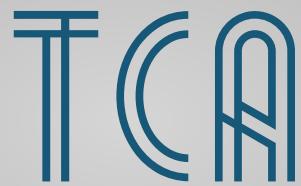
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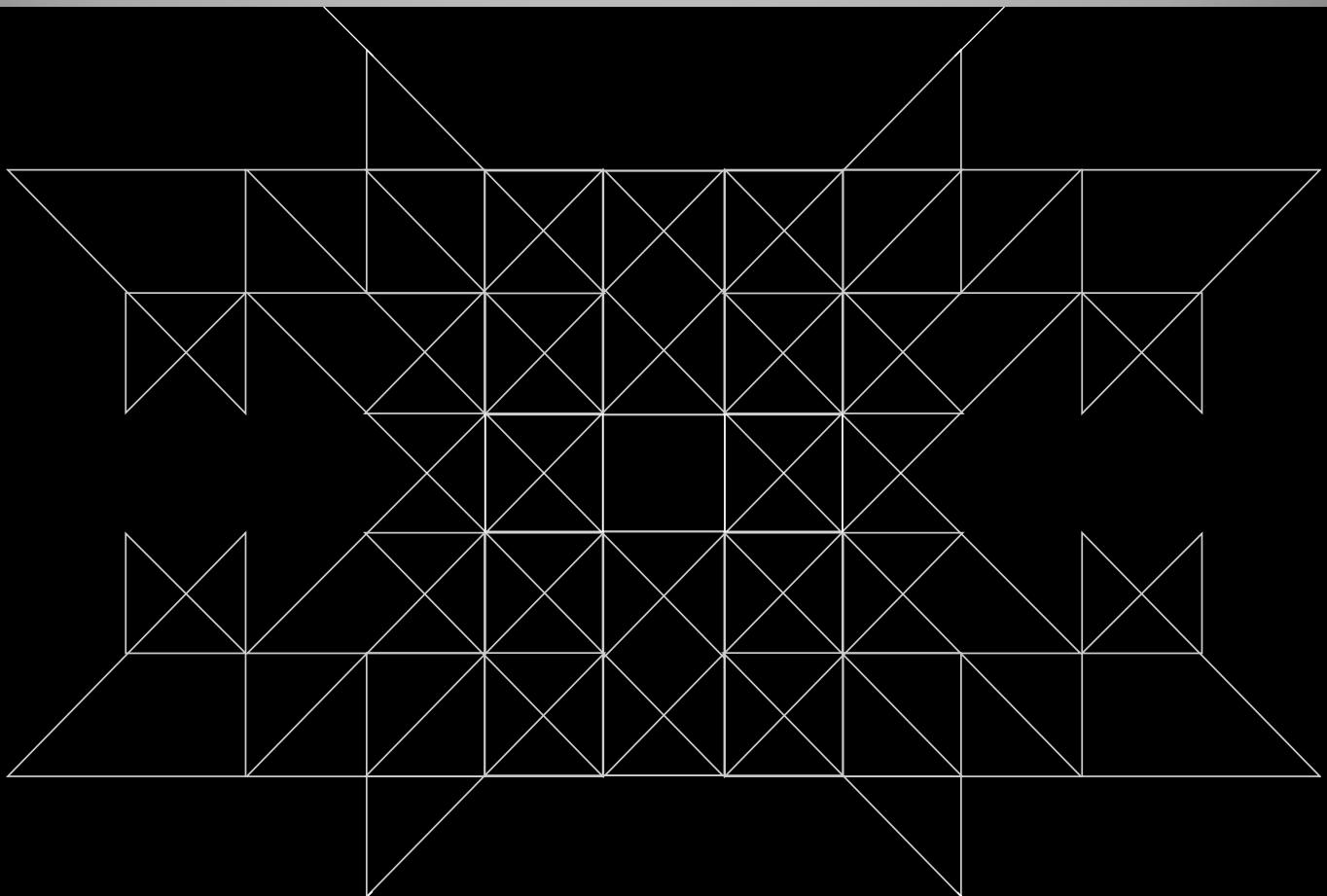
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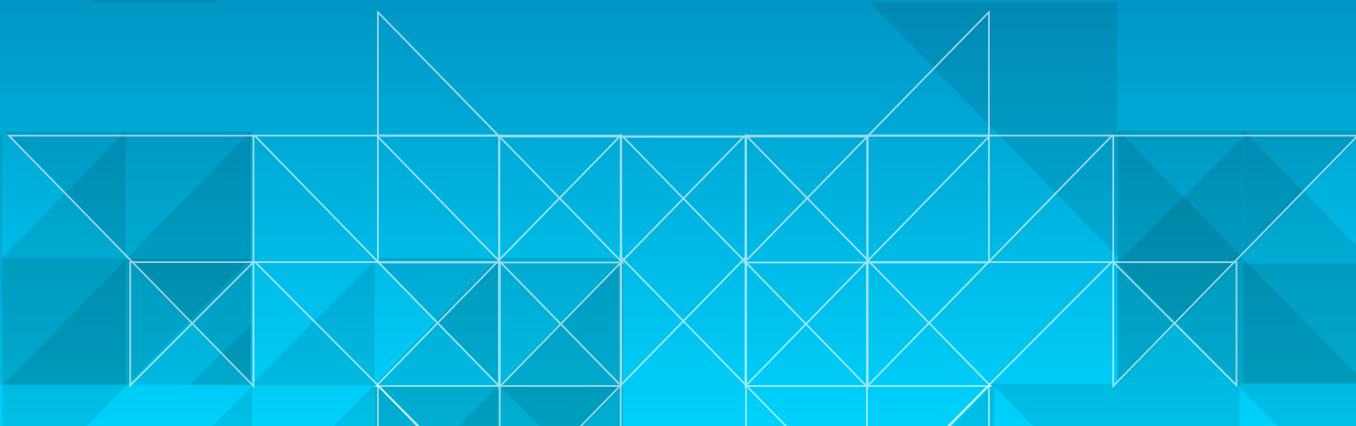
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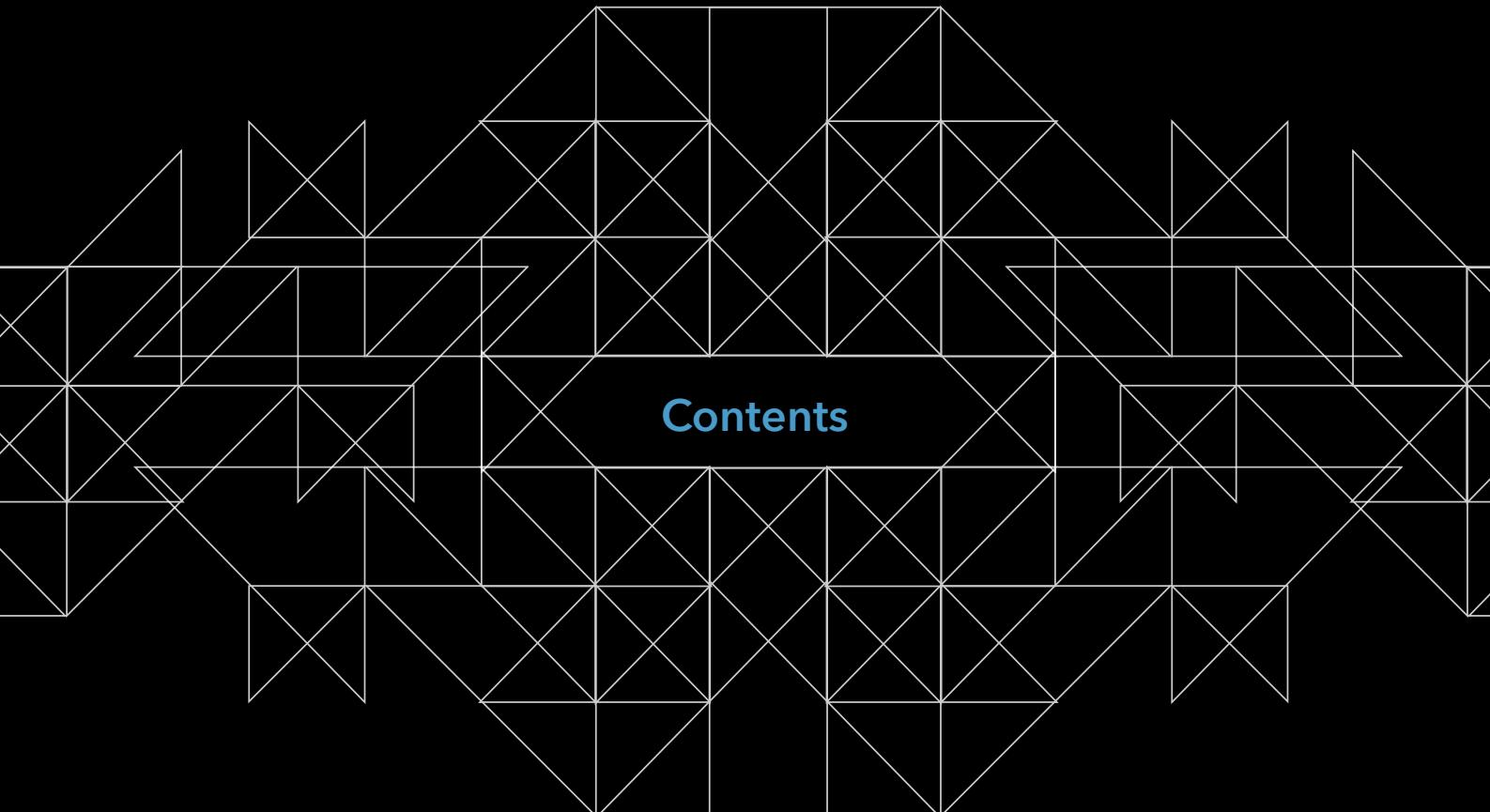
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Message From the Editor

We are about to be 40
in the next issue. We
are middle age but we
are still excited!

From the dawn of 2016, The Clinical Academia will be in English only. We will publish more often, six issues a year or every two months. Ethics will be the area we focus on with the practical strategic plan. As we are a part of Asean Citation Index (ACI) after we have been long in Class I of the Thai Citation Index (TCI) since the beginning of the introduction of classification system in Thailand. High quality is the must. Our passion to bring out the best in every research presented in this journal and deliver properly to our audiences is still going on. It would be no more or no less when we talking about medicine. The world of medicine always moves forward. Here now and then are its places. Keep going is the best suggestion for all of us. Gather the most of evidences before make any decisions, read between the lines to see the real information without bias. There is not thing such a panacea. Evidences are still needed for the maximum benefit of the mankind. Hope you enjoy reading our yellow issue of The Clinical Academia.



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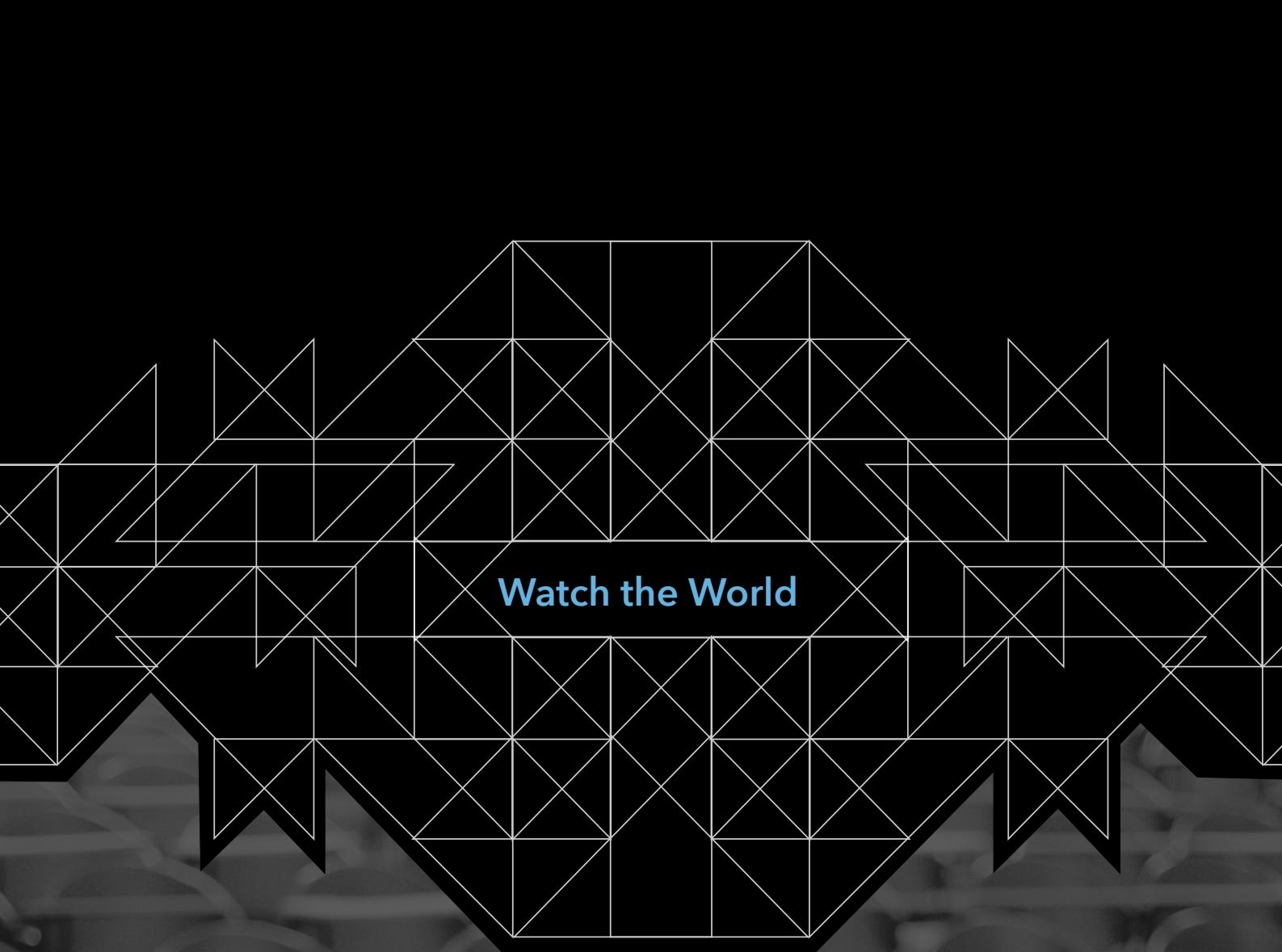
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Watch the World

History of Medicine
(continued)

Thammasorn Piriyasupong, M.D., Ph.D.

The Clinical Academia

From the Volume 39 Issue 1, we left with the history of medicine at the Dark Age, and here is what we have next after 15 AD. The blossom of knowledge began again, Renaissance, when Paracelsus, a Swiss German botanist, philosopher, doctor, astrologer, and general occultist who was named as the father of toxicology. He was one of the first medical doctor to encourage that physicians required a strong academic knowledge in the natural sciences, especially in the field of chemistry. His view was that illness and health in the body was basically based on the harmony of (i) man or microcosm and (ii) surrounding or nature or macrocosm. He took an approach differently from the doctor before him, using this analogy not in the way of soul-purification but in the way that humans had to have certain equilibrium of minerals in the bodies, and that certain illnesses of the body had chemical treatment that could help them. He was considered as the one who brought the new approach of medicine and the term of dosage of chemistry to be used since then. However, he died in an tragic event as he was named after his reputation for anger in 1541.

Andreas Vesalius was one and the very first pioneer who are very obsessed with anatomy after Galen who lived in 200 AD. He was born around 1500 AD and spent many years in anatomy research. At his time, corpse dissection was still prohibited. Thus, we must think that he expanded his knowledge might have to involve with some illicit procedures but that did not refrain him for exploring human body. He published his first book "*De Humani Corporis Fabrica- on the fabric of the human body*" in 1543. This book was a groundbreaking to what we had known for human anatomy since Galen. However, his life was ended in tragic, similar to the those advance thinkers to the time. Vesalius, who

lived in Spain with close connections to King Philip II, had been asked to treat a Spanish nobleman who subsequently died. Vesalius asked the family if he could do an autopsy on the body to determine the cause of his death, however, when he cut into the body it was discovered that the he was still alive. The family later called for Vesalius's execution for murder, however, the King himself intervened and saved Vesalius with a promise that he would perform penance for the crime by a pilgrimage to Jerusalem and Mount Sinai. In 1564, he left for a trip to the Holy Land but died on 15 October 1564 on the Greek island of Zakynthos during the journey home.

Ambroise Paré was born around 1500 AD in the Northwestern France in the family of barber surgeons. In the past, minor surgery was done by a barber that is for the reason for the symbol of spiral of red and white in front of every barber shop stand for blood and dressing. However, he was the one who upscaled the practice of surgeon went beyond the usual practice at the time and set a new landmark for surgery as well as obstetrics. A collection of Paré's works (he published these separately throughout his lifetime journey, based on his experiences treating soldiers from war) was published at Paris in 1575. From this, he was later called, Father of Surgery.

William Harvey who was born in 1578 and became the physician of King of England, was the one who discovered the circulation system of human being as previously we know only anatomy from Galen and Vesalius but we lacked of the knowledge of circulation system. He was an English physician who made seminal contributions in anatomy and physiology and in detail the systemic circulation and properties of blood being pumped to the brain and body by the heart.

We are now moving to more recent explorers of medicine; Edward Jenner. He was the one who saved us from the Small Pox back to date around 1800 AD. He was trained and involving in biology with great progress in clinical surgery while studying with John Hunter in London. While Jenner's interest in the protective effects of cowpox began during his apprenticeship with George Harwicke, it was 1796 before he made the first step in the long process before smallpox was totally eradicated. The record shows that it was there that Jenner heard a dairymaid say, "I shall never have smallpox for I have had cowpox. I shall never have an ugly pockmarked face." It was a common belief that dairymaids were in some way protected from smallpox. On May 14, 1796, using substance from Nelms' lesions, he inoculated an 8-year-old boy, James Phipps to prove his idea. Subsequently, the boy developed mild fever and discomfort in the axillae. Nine days after the procedure he felt cold and had lost his appetite, but on the next day he was recovered. In July 1796, Jenner inoculated the boy again, this time with substance from a fresh smallpox lesion. No disease developed, and Jenner concluded that protection was complete.

In 1797, Jenner submitted his idea to the Royal Society describing his experiment and observations. However, the paper was rejected. Then in 1798, having added a few more cases to his initial experiment, Jenner privately published a small booklet entitled "*An Inquiry into the Causes and Effects of the Variolae Vaccinae, a disease discovered in some of the western counties of England, particularly Gloucestershire and Known by the Name of Cow Pox*". Before, the world recognised his works, he was in the difficult position where people or even media made joke for his invention (Figure 1).



Figure 1. Media Made Joke with Jenner's Procedure

Ignaz Semmelweis was a Hungarian doctor who known for an early pioneer of antiseptic procedures. He discovered that the incidence of puerperal fever or childbed fever could be dramatically reduced by the use of hand disinfection in obstetrical clinics. Puerperal fever was common in mid-19th-century hospitals and often fatal, with mortality rate about 10–35%. He proposed the practice of washing hands with chlorinated lime solutions in 1847 while working in Vienna General Hospital's First Obstetrical Clinic, where doctors' wards had three times higher mortality than the midwives' wards. He published a book of his findings in *Etiology, Concept and Prophylaxis of Childbed Fever*.

In spite of various publications of results that hand washing reduced mortality to below 1%, Semmelweis's observations contradicted with the established scientific and medical opinions at that time and his ideas were rejected by the medical community. Some were offended at the suggestion that they should wash their hands and Semmelweis could offer no acceptable scientific explanation for his findings. Semmelweis's practice earned widespread acceptance years after his death, when Louis Pasteur confirmed the germ theory and Joseph Lister, later acting on the French microbiologist's research,

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practiced and operated, using hygienic methods with high success. In 1865, Semmelweis was committed to an asylum, where he died at the age of 47 only 14 days after he was committed. The era of antiseptics was begun since then.

In term medical device, stethoscope was firstly invented on the last day of 1815 by Rene' Leanne, a French physician. X-ray was later discovered in 1895 by Wilhelm Conrad Roentgen, a German physicist. Eight years later electrocardiogram was invented in 1903 by Willem Einthoven. However, the first commercial drug in the world was morphine and quinine in which the local apothecaries expanded their role from distributing botanical drugs to wholesale manufacture in 1800s. At that time, morphine was the analgesic and sleep-inducing agent that were extracted from plants. Multinational corporations

including Merck, Roche, Wellcome, Abbott, Upjohn began to establish local apothecary shops. Later in late 1880s, organic chemical synthesis was performed.

Antibiotics was firstly invented by Alexander Fleming in 1928 but the production for the large scale have to wait till nearly the end of the World War II. At that time, Bayer, the German pharmaceutical company introduced Prontosil, the sulfonamid class of antibiotics that was really used in the mass scale prior to that of penicillin.

History of medicine tells us that we are very young at age, our knowledge is so limited. Drugs, medical devices and medical principles are relatively new. We then can be arrogant and ignore the truth of nature that we do not truly understand. Ultimate knowledge is not yet to come. Learn is the only option we have.

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Intussusception in Adults: Case Reports and Review of Literature

Wipawadee Saenkote, M.D.

Radiology Department, Mahasarakam Hospital, Thailand

ABSTRACT

Intussusception is an invagination of the proximal bowel loops into the more distal bowel loops. Adult intussusception is rare. It accounts only 5% of all intussusceptions and its clinical presentations are not as classical as that in children. Secondary intussusception is more common in adults due to various causes. Intussusception can be diagnosed easily by both ultrasonography (US) and computed tomography (CT). CT may give more details about lead point which is important for treatment plan. Surgery is the definite treatment. Bowel resection without intussusception reduction is more acceptable unless the leading point is benign. In this report, we have identified six cases of intussusception in adults between Nov 2013 and Nov 2015. All of them were well recovered after prompt interventions.



ORIGINAL ARTICLE

INTRODUCTION

Adult intussusception is rare and occurs about 5% of all intussusceptions and causes only 1% of all intestinal obstructions.¹ Unlike intussusception in children which mostly idiopathic;² 70-90% of adult intussusceptions usually have leading points.^{3,4} The lead point of the adult intussusception may be primary or secondary intestinal malignancy or non-neoplastic aetiology e.g., polyps, lipoma, Meckel's diverticulum and parasites. The most common leading point is intestinal neoplasm and found about 65% of cases.¹ The most common site is small intestine.⁵

The bowel loops and mesenteric fold telescopes inside the lumen of the adjacent bowel loops are called intussusception. The invaginated loops are called intussusceptum. The outer bowel loops are known as intussuscipiens (Figure 1).³ These are producing a complex soft-tissue mass consists of intussusceptum and intussuscipiens. The leading point may be seen distal to the tip of the telescoped bowel loops. There are four categories of intussusceptions classified by site of origin. They are enteroenteric, ileocolic, ileocaecal, and colocolic intussusceptions.⁵ They may also classified based on the presence of lead point as intussusception with lead point and without leading point or idiopathic.³ Since the clinical symptoms are not specific and often long standing. The imaging such as ultrasonography (US) and computed tomography (CT) play an important role in term of diagnosis, find lead point, and give treatment plans.⁹ The sensitivity of US for the diagnosis of the intussusception is approximately 98-100%.² The appearance of intussusception on US depends on the axis of the scanned intussusception. On axial scans, the multiple concentric ring sign and crescent-in-doughnut sign are seen (Figure 1A). On the longitudinal scans, the hayfork sign and sandwich sign are seen (Figure 1B). On

oblique view, the intussusception is seen as pseudokidney sign (Figure 1C.) bowel-within-bowel appearance.³ On axial plane, the intussusception may be seen in round target mass. From the CT, it can be seen as pseudokidney or sausage-shaped mass on perpendicularly axis (Figure 2).^{3,8,10,11} The proximal bowel dilatation may or may not be seen.^{3,8,11} CT is very helpful in identification of lead point, particularly in large bowel intussusception which is more likely to have neoplastic aetiology, approximately 50-60%.^{3,7} Primary neoplasm is more common than metastasis. However, benign or malignant lead point cannot be totally distinguished by CT.¹¹ In the case with malignant lead point, CT can help staging.¹² Despite the pathognomonic appearance of intussusception on CT and US, the lead point is not being readily identified.⁸ The lead point may be small, hidden within the intussusception, and infrequently seen.^{8,10,11} The surgical treatment with simple resection in adult intussusception is required in most cases. The resection without reduction is preferred but still controversial.^{5,12}

REPORT OF CASES

Case 1

A 66-year-old male presented with perumbilical pain for about 12 hours and had a shifting of pain to right lower quadrant (RLQ) with nausea and vomiting for a few hours. He had been diagnosed with smear positive pulmonary tuberculosis for 3 years and had a completed course of treatment. In this admission, he was suspected of having an abdominal mass at RLQ. He underwent an emergency ultrasonography of the whole abdomen which showed ileocolic intussusception with severe small bowel dilatation and small amount of ascites (Figure 3). At the emergency laparotomy, the ileocolic intussusception was found and then the end-to-side anastomosis was done.

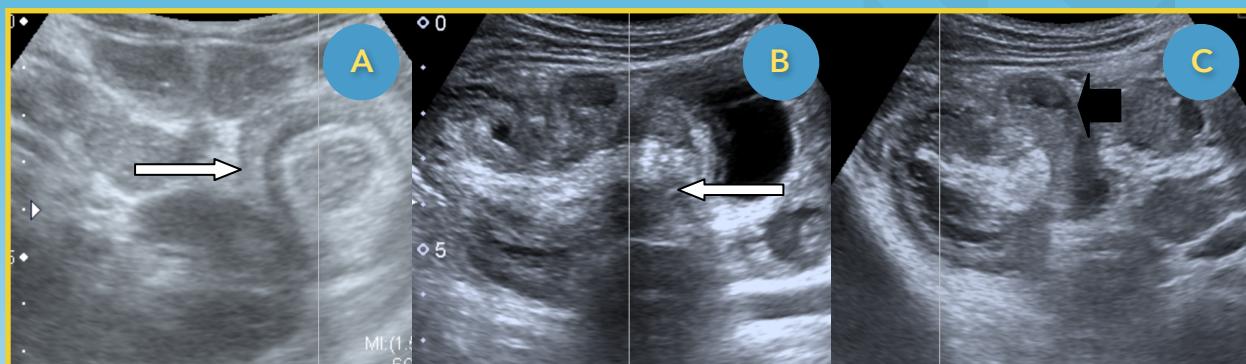


Figure 1. Ultrasonography Findings.

Panel A, the ultrasonography of a 12-year-old boy presented with recurrent episodes of abdominal pain. He had colocolic intussusception caused by tubular adenoma of distal transverse colon. The axial scan shows multiple concentric ring sign (open arrow); Panel B & C show findings of patient with idiopathic adult intussusception; Panel B, the longitudinal view shows hayfork sign (open arrow); Panel C, he oblique view shows pseudokidney sign (black arrow).The intussusception on CT is clearly seen. It typically shows a pathognomonic.

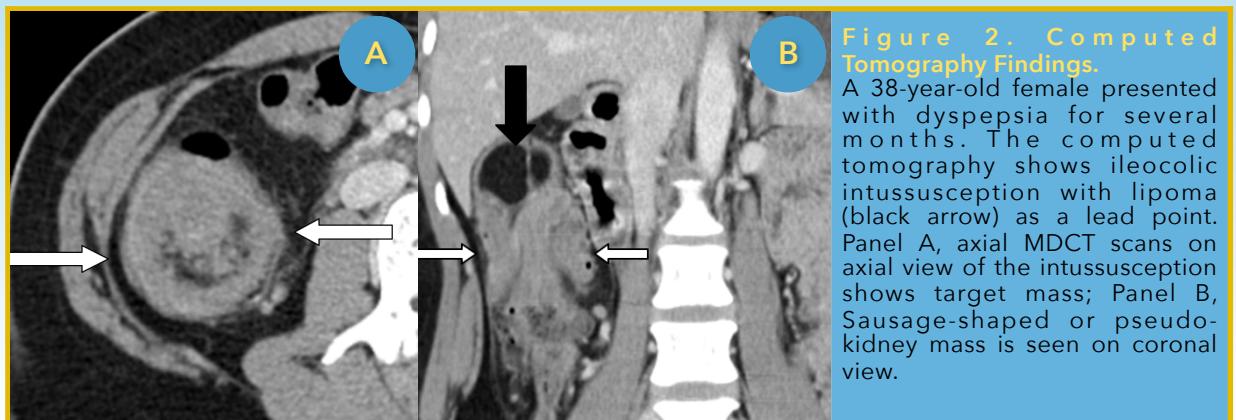


Figure 2. Computed Tomography Findings.

A 38-year-old female presented with dyspepsia for several months. The computed tomography shows ileocecal intussusception with lipoma (black arrow) as a lead point. Panel A, axial MDCT scans on axial view of the intussusception shows target mass; Panel B, Sausage-shaped or pseudokidney mass is seen on coronal view.

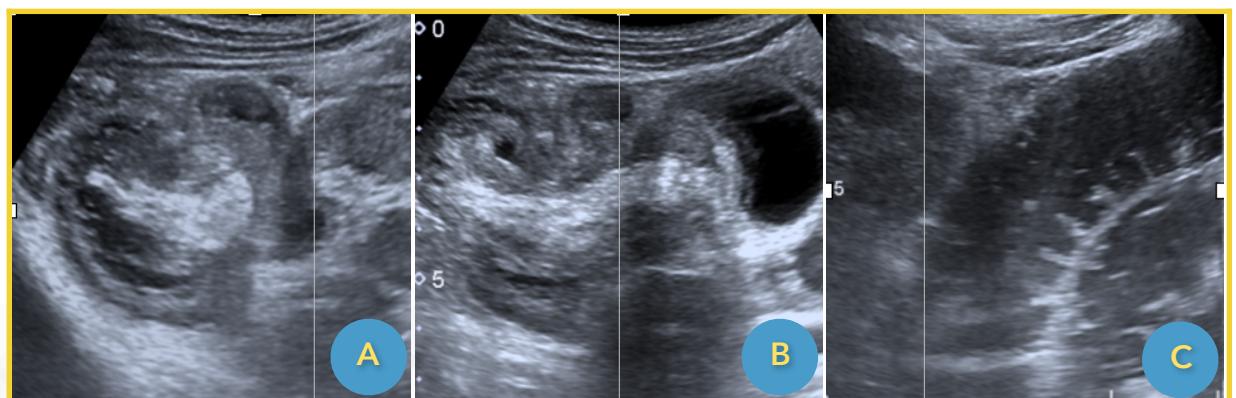


Figure 3. Ultrasonography Findings of Case 1.

Panel A, An emergency ultrasonography of the whole abdomen demonstrates the oblique scan of the intussusception with pseudokidney sign; Panel B, longitudinal scan of the intussusception with hay-fork sign; Panel C, The dilated small bowel loops which indicate small bowel obstruction are seen.

He made an eventful recovery. Pathology showed coagulative necrosis of the leading point (Figure 4) of the resected

colon without bowel mass, adenoma, or diverticulum. Reactive lymph nodes were found.

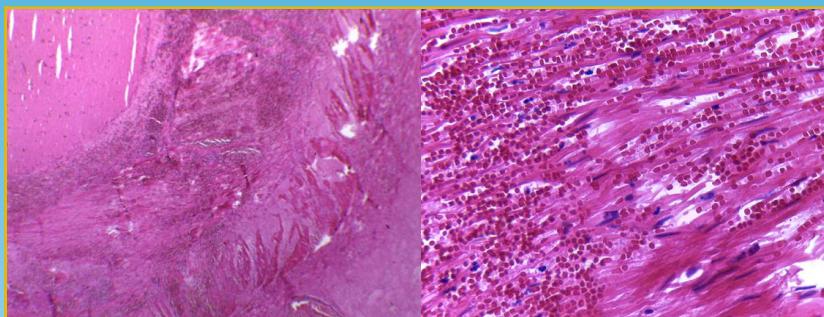


Figure 4. Histological Findings of the Case I.

The pathological diagnosis showed intussusception with coagulative necrosis of the leading point. No malignancy or adenoma is seen. Ten reactive lymph nodes were found.

Case 2

A 53-year-old female presented with left lower quadrant pain for a few days. She had severe nausea and vomiting with no passing of stool and gas for a day. She had a history of abdominal surgery for cholecystectomy for a few years.

Her abdominal examination at the admission showed distended abdomen with marked and localized rebound tenderness at left lower quadrant of the abdomen. No mass was palpated. The acute abdomen series showed distal small bowel obstruction with classic step-ladder pattern (Figure 5). She was diagnosed as complete gut obstruction and was send for an emergency computed tomography of the whole abdomen. Her computed tomography was done without intravenous contrast administration due to her impair renal function. It showed ileo-ileal intussusception with small bowel obstruction. A 2.5-cm soft tissue density tumor at the tip of the intussusceptum was seen. The midline laparotomy was done. The ileo-ileal intussusception with a 2.5-cm small bowel tumor as a leading point was found. The small bowel resection without intussusception reduction was done. An eventful recovery was occurred. The pathology report showed an inflammatory small bowel polyp with benign ulceration and granulation tissue.

Case 3

A 50-year-old male presented with constipation and nausea for a week. He had history of low intake for a few months. He was diagnosed with partial gut obstruction. The computed tomography showed a long

segment of small bowel intussusception at right-sided abdomen with proximal small bowel obstruction (Figure 6). At the laparotomy, the computed tomography findings were confirmed. The enteric intussusception was found. The small bowel resection without reduction of the intussusception and end-to-end anastomosis were done. The pathology showed acute inflammation with coagulative necrosis of the jejunum. The leading cause of the intussusception was Taenia species parasitic infection.

Case 4

A 48-year-old male presented with left lower abdominal pain, nausea, and constipation for several weeks. He experienced anorexia and intermittent abdominal pain for a month. He had been diagnosed with primary lung cancer for a few months before this visit but he refused the treatment. The abdominal examination showed no mass. The acute abdominal series showed dilated small bowels with right parahilar mass (Figure 7). The consequent CT showed enteric and ileocolic intussusceptions with irregular-shaped, enhancing small bowel masses at the tip of the intussusceptum as the lead points along with jejunal mass. These are causing small bowel obstruction. The laparotomy with reduction of intussusceptions was done and multiple small bowel masses were found during the operation. The terminal ileal perforation was seen. The small bowel resection with end-to-end anastomosis was done. The pathology report from the operational biopsy showed metastatic small bowel masses from primary lung cancer.

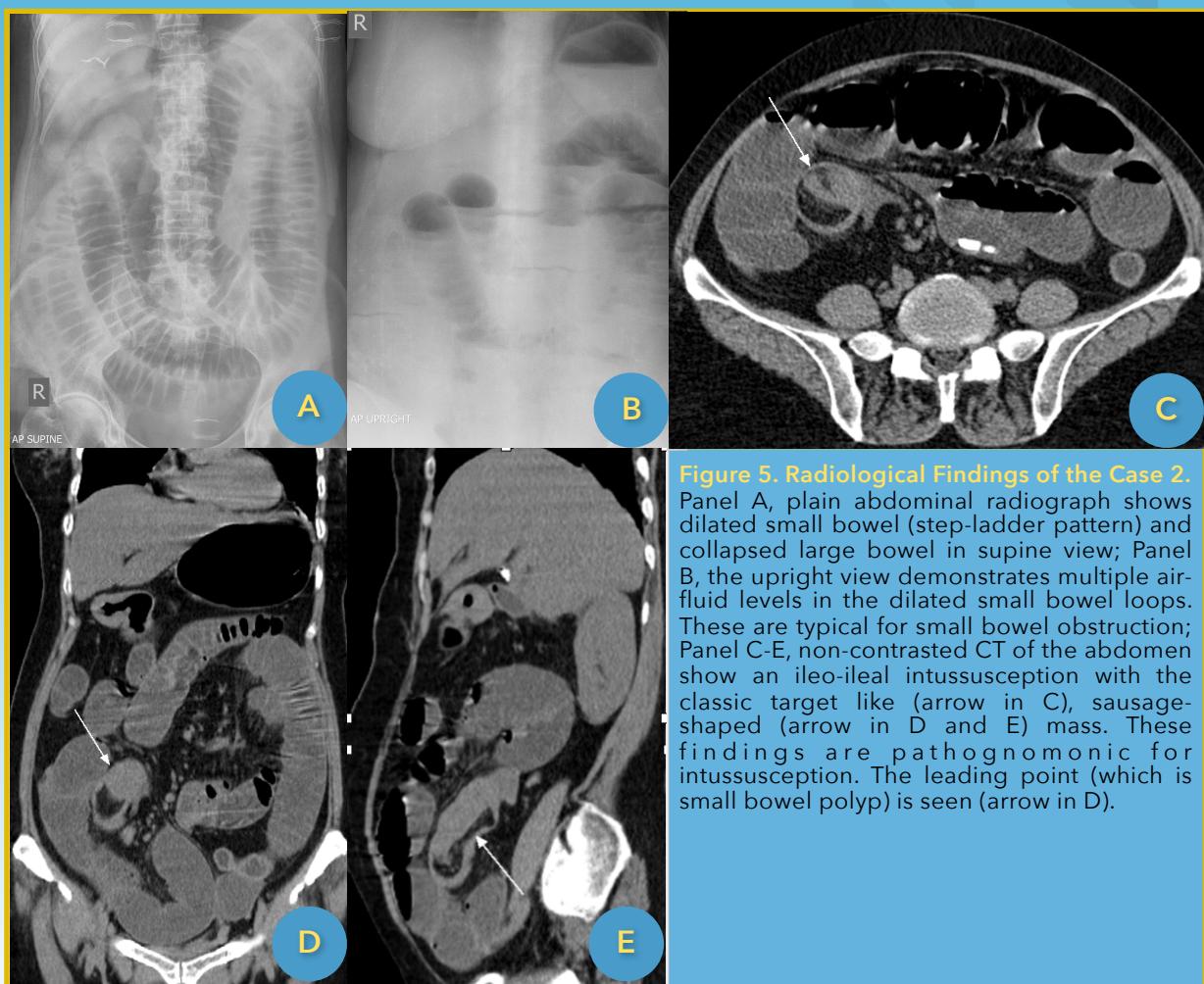


Figure 5. Radiological Findings of the Case 2.
 Panel A, plain abdominal radiograph shows dilated small bowel (step-ladder pattern) and collapsed large bowel in supine view; Panel B, the upright view demonstrates multiple air-fluid levels in the dilated small bowel loops. These are typical for small bowel obstruction; Panel C-E, non-contrasted CT of the abdomen show an ileo-ileal intussusception with the classic target like (arrow in C), sausage-shaped (arrow in D and E) mass. These findings are pathognomonic for intussusception. The leading point (which is small bowel polyp) is seen (arrow in D).

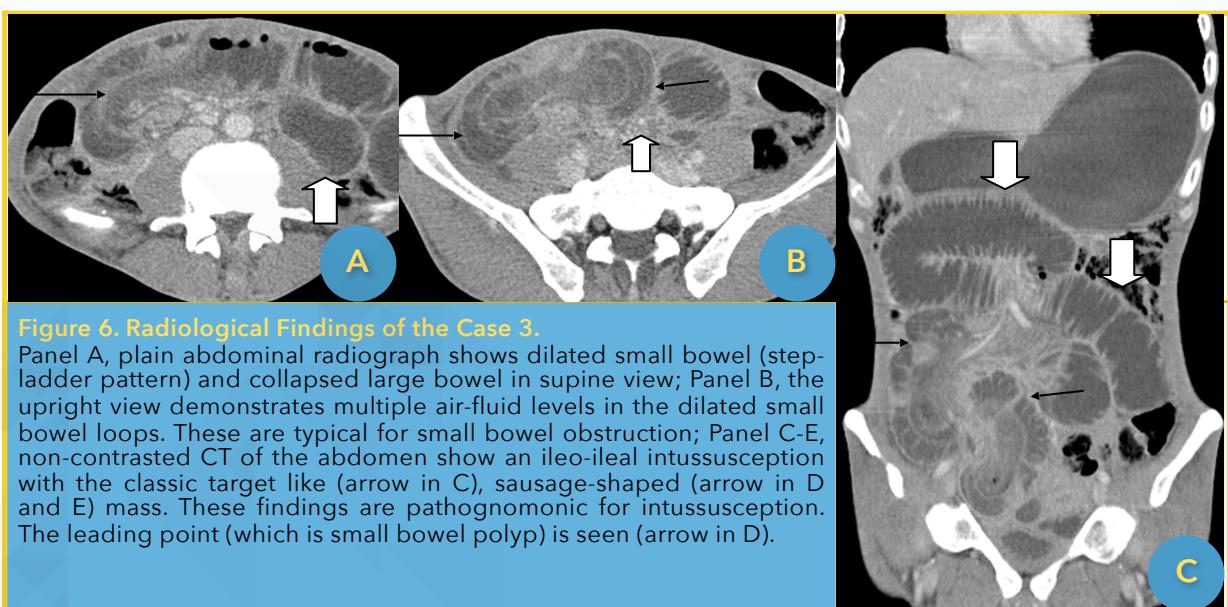


Figure 6. Radiological Findings of the Case 3.
 Panel A, plain abdominal radiograph shows dilated small bowel (step-ladder pattern) and collapsed large bowel in supine view; Panel B, the upright view demonstrates multiple air-fluid levels in the dilated small bowel loops. These are typical for small bowel obstruction; Panel C-E, non-contrasted CT of the abdomen show an ileo-ileal intussusception with the classic target like (arrow in C), sausage-shaped (arrow in D and E) mass. These findings are pathognomonic for intussusception. The leading point (which is small bowel polyp) is seen (arrow in D).

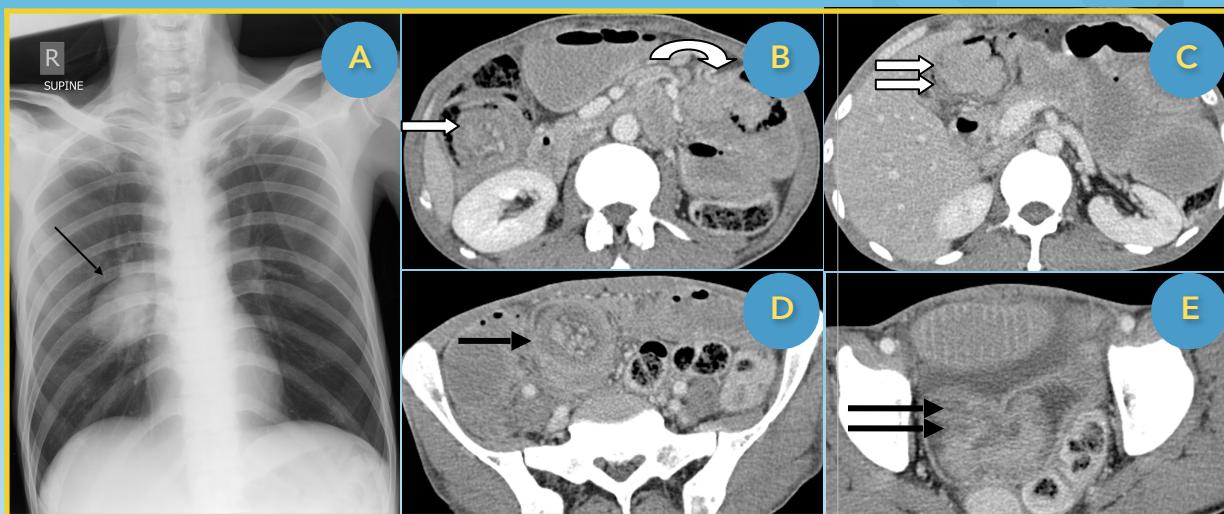


Figure 7. Radiological Findings of the Case 4.

Panel A, Supine chest radiograph showed right hilar mass (arrow); Panel B-E, the axial CT shows ileocolic intussusception (open arrow in Panel B), enhancing soft tissue mass at tip of the ileocolic intussusception (double open arrows in Panel C), enteric intussusception (arrow in Panel D) and enhancing soft tissue mass as lead point (double arrows in Panel E). There were also depicted multiple irregular-shaped, enhancing small bowel masses (curve arrow in Panel B).

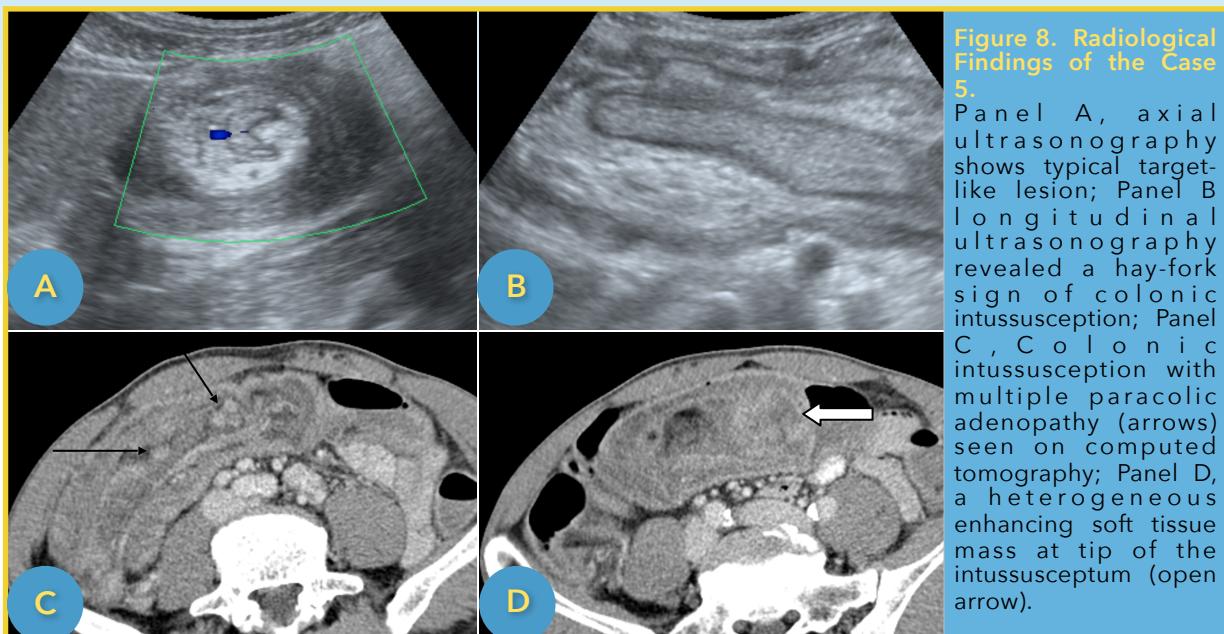


Figure 8. Radiological Findings of the Case 5.

Panel A, axial ultrasonography shows typical target-like lesion; Panel B longitudinal ultrasonography revealed a hay-fork sign of colonic intussusception; Panel C, Colonic intussusception with multiple paracolic adenopathy (arrows) seen on computed tomography; Panel D, a heterogeneous enhancing soft tissue mass at tip of the intussusceptum (open arrow).

the colon (Figure 8). No lead point was depicted by ultrasound. The consequent CT showed colonic intussusception at right-sided abdomen. An irregular-shaped, heterogeneous enhancing soft tissue mass was seen at the tip of the intussusceptum. Multiple paracolic adenopathy were seen. He was diagnosed with suspected colonic cancer with colonic intussusception. The

cecal mass and colonic intussusception were found during operation. He underwent an emergency exploratory laparotomy with right hemicolectomy without reduction of the intussusception. He had a good post operative recovery. The pathological report showed a $5.4 \times 4.5 \times 2.5$ -cm poorly differentiated adenocarcinoma of the cecum as a lead point.

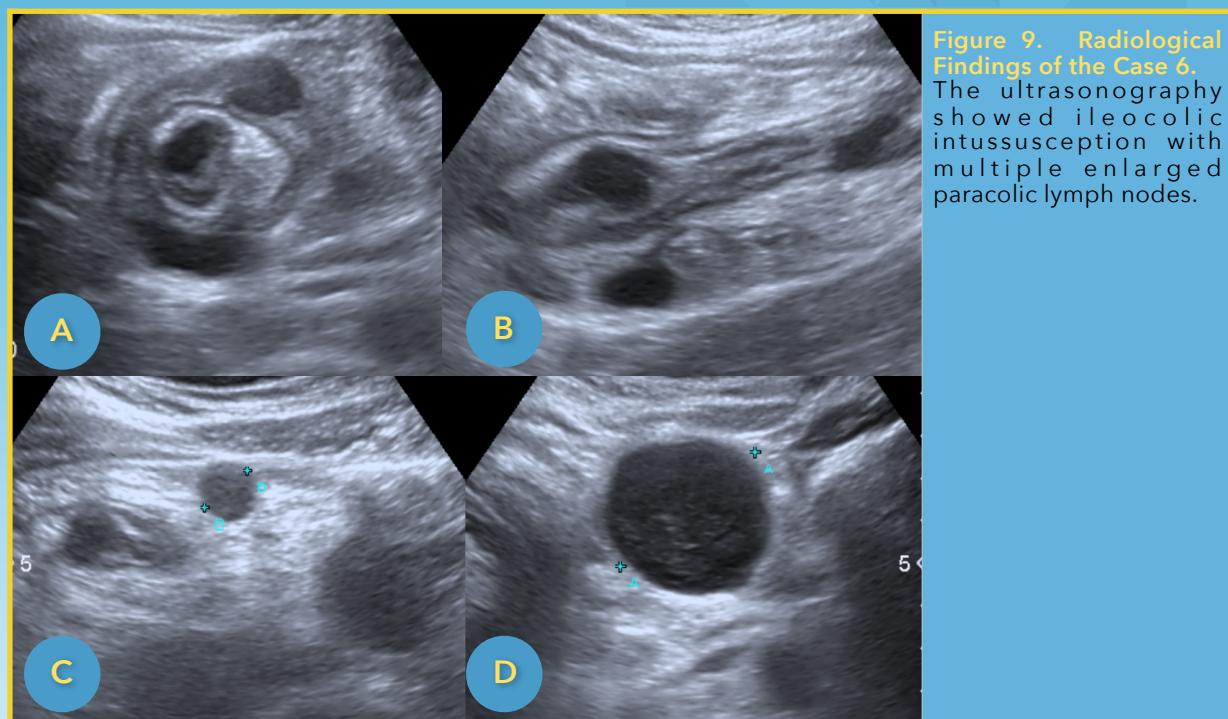


Figure 9. Radiological Findings of the Case 6.
The ultrasonography showed ileocolic intussusception with multiple enlarged paracolic lymph nodes.

Case 6

A 41-year-old male presented with intermittent abdominal pain for a month. He had no fever. His physical examination was unremarkable. He was sent for ultrasonography which showed ileocolic intussusception at right-sided abdomen (Figure 8). There were multiple enlarged paracolic lymph nodes. He underwent right hemicolectomy without intussusception reduction. The ileocolic intussusception was found in operation. The pathological report showed diffuse large B-cell lymphoma of terminal ileum, IC valve, cecum, and paracolic lymph nodes.

CASE DISCUSSION

In this review of six patients diagnosed with adult intussusception; one case was idiopathic intussusception and five cases had lead point. Two of five cases the lead point were benign; one was small bowel polyp and the latter one was parasite. Three cases had malignant lead points. One case was primary adenocarcinoma of the cecum; one was lymphoma; and one was metastatic

lung cancer to small bowel. Three of five cases whom had lead points; CT could identify lead points in two cases. US could pick up only lymph nodes but could not pick up bowel mass in one case. These showed superiority of CT than US in finding lead point. Simple bowel resection without intussusception reduction was done for all.

In conclusion, adult intussusception is rare and its signs and symptoms are not as typical and as frequent as in younger patients. The investigation such as ultrasonography and especially computed tomography play very important role in giving diagnosis and treatment plan. Lead point is infrequently seen and CT is more superior to ultrasonography. Due to more frequently seen lead points, surgical intervention is usually required.

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A Case Report of Adult Intestinal Intussusceptions: Presenting at Khon Kaen Hospital

Sureeporn Tipsuntornsak, M.D.

Department of Radiology, Khon Kaen Hospital,
Khon Kaen, Thailand

ABSTRACT

Intussusception of the bowel is defined as the proximal segment of the gastrointestinal tract within the lumen of adjacent segment. In most cases of intussusceptions occur in children from the age of 6 months to 6 years old. However, bowel intussusception in adult is considered a rare condition, accounting for 5% of all cases of intussusceptions. Eight to twenty percent of cases are idiopathic, without a lead point. Secondary intussusceptions is caused by organic lesions, such as inflammatory bowel disease, postoperative adhesion, Meckel's diverticulum, benign and malignant lesion, metastatic neoplasm or even iatrogenic. Computed tomography (CT) is the most sensitive diagnostic modality and can distinguish between intussusceptions with or without a lead point. In this report, we presented a 62 years old case with diagnosis of intussusceptions at Khon Kaen Hospital, Thailand.

INTRODUCTION

Adult intussusception represents 5% of all cases of intussusceptions and account for only 1-5% of intestinal obstructions in adult.¹ In children, it is usually primary and benign. In contrast, almost 90% of cases of intussusceptions in adults are secondary, to a pathologic condition.¹ Due to a significant risk of associated malignancy, which approximates 65%, radiologic decompression is not addressed preoperative in adults unlike in children.^{2,3} Therefore, 70-90% of adults cases of intussusceptions require definite treatment of choice.⁴

In adult, the exact mechanism of bowel intussusceptions is an unknown.^{5,6} Intussusceptions is believed to initiate from any pathologic lesion of the bowel or irritant within the lumen that alters normal peristaltic activity and serves as a lead point, which is able to initiate an invagination of one segment of the bowel into one another.^{4,5} This process is resulting in compromising the mesenteric vascular flow of the Intussusceptions segment, the result is bowel obstruction.

Intussusceptions have been classified according to their location in four categories; (i) entero-enteric, confined to the small bowel, (ii) colo-colic, involving the large bowel only, (iii) ileo-colic, defined as the prolapsed of the terminal ileum with in the ascending colon and (iv) ileo-cecal, where the ileo-cecal valve is the leading point of intussusceptions and that is distinguished with some difficulty from the ileo-colic variant.^{3,6,7}

Intussusceptions have also been classified according to the aetiology weather benign, malignant or idiopathic causes. The causes of intussusceptions including the presented of intra- or extra-luminal lesion (inflammatory lesion, Meckel's diverticulum, postoperative adhesions, lipoma, adenomatous polyp, lymphoma and

metastases, or iatrogenic, e.s. due to the presence of an intestinal tube.⁸ Intussusceptions occurring in the large bowel is more likely to have a malignant aetiology and represents up to about 66% of cases.^{4,5,9}

REPORT OF CASES

A 62-year-old man with no significant past medical history presented to Khon Kaen Hospital with clinical history of frequent colicky abdominal pain for about a day. He also had the history of passing stool with blood streak twice then became constipation while the degree of abdominal pain had been increasing or worsening and he decided to come to the Hospital. At the time of presentation to the emergency room, his temperature was 37 degree Celcius, blood pressure 175/100 mmHg, pulse rate 90 beat/minute, respiratory rate 20 breath/minute. Heart and lung examination were unremarkable. At abdominal examination he had appreciable bowel sounds with abdominal tenderness, more at right lower quadrant. No intrabdominal mass was palpated neither nor rebound tenderness. Laboratory tests were within the normal range with plain films of acute abdomen series showed bowel loops dilatation with air-fluid fill bowel (Figure 1). Abdominal computed tomography (CT) showed evidence of air-fluid filled bowel loops, diffusely. There was evidence of double bowel loops or wall which the distal bowel segment was invaginated into the contiguous of proximal bowel segment.III-defined mild inhomogeneous enhancing lesion intramurally at ileo-cecal valve region was suspected. the density was about 120 hour field unit. This was possibly due to inflammatory process but tumor mass cannot be totally excluded. The small bowel loops were normal caliber. There was significant edema of surrounding fat.

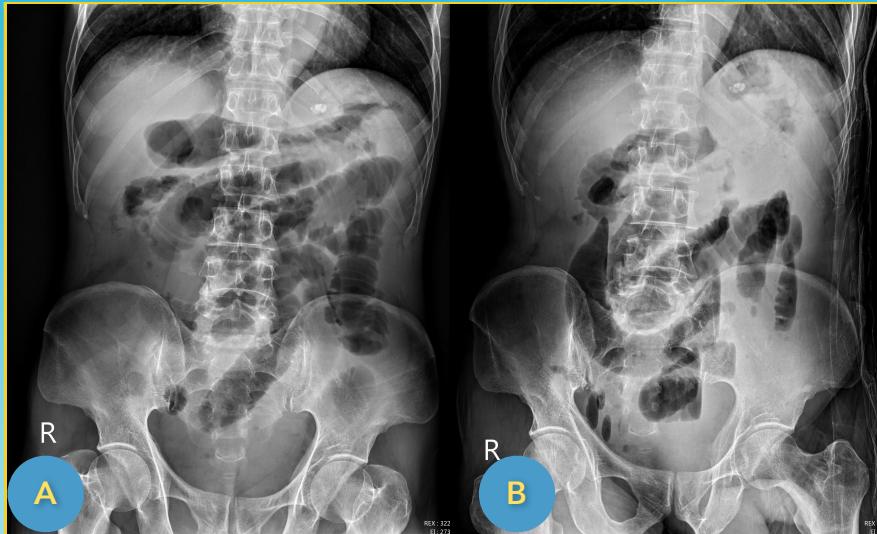


Figure 1. Plain X-Ray Film of the Abdomen of the Case.

Panel A, supine anteroposterior view, found generalised small bowel dilatation; Panel B, evidence of air fluid filled bowel, no pneumoperitoneum was seen.

In this adult intussusceptions the post operative diagnosis informed us that it was ilico-colic intussusceptions and the pathological report of resected bowel segment told that it was granulomatous

inflammatory lesion. Acid fast bacilli staining was negative. The leading point in this adult intussusceptions, was then, concluded that it was caused by inflammatory lesion at distal ileum.

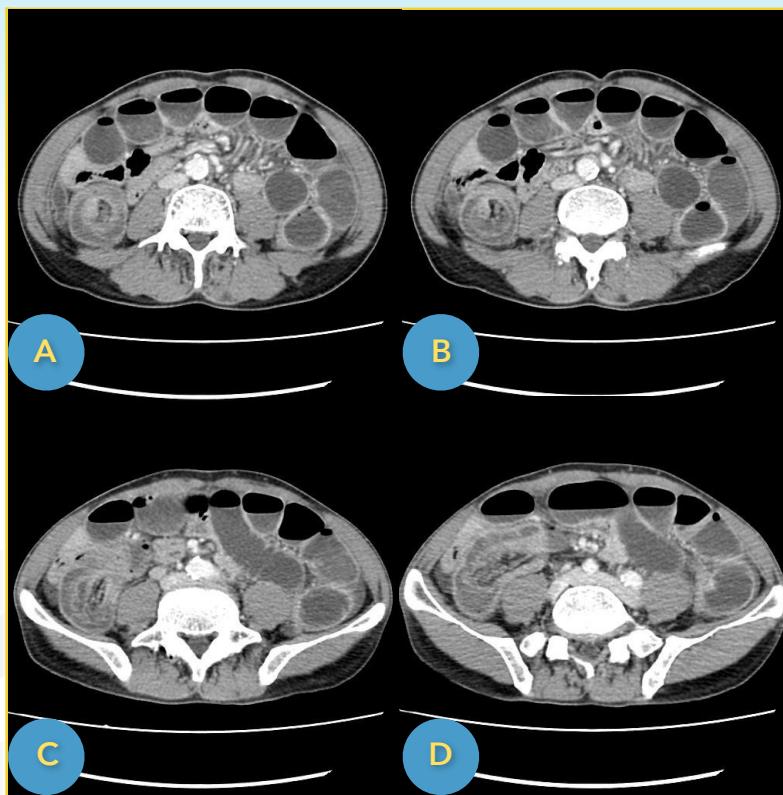


Figure 2. Abdominal computed tomography in adult intussusceptions.

Panel A and B, The characteristic "target" sign soft tissue mass with a layering effect of a 62 - year old male patient without any underlying disease. From target sign which is then observed as the sausage sign (Panel C and D). There is radiolucent (dark) streak of fatty mesentery bordered by a sheath of hyperdense soft tissue of the bowel wall.

CASE DISCUSSION

Variability in clinical presentation and imaging features often make the preoperative diagnosis of intussusceptions a challenging and difficult task. Abdominal computed tomography (CT) is currently considered as the most sensitive radiologic method to confirm intussusceptions with a reported of diagnostic accuracy of 58-100%.^{1,5,10,11} The characteristic features of CT scan include an inhomogeneous "target" or "sausage" shaped soft-tissue mass effect mesenteric vessels within the bowel lumen are also typical.⁴ CT scan may define the location, the nature of the mass and additionally it may also help in staging the patient with suspected malignancy causing the intussusceptions.⁹

In the report of Kim et al¹² abdominal CT was able to distinguish between intussusceptions without a lead point (feature: no sign of proximal bowel obstruction, target like or sausage-shape mass, layering effect) out from that with a lead point (feature: no sign of proximal bowel obstruction, bowel wall edema with loss of classic three-larger appearance due to impaired mesenteric circulation and demonstration of a lead mass). Adult bowel intussusceptions is rare but challenging condition for radiologists and the surgeons. Preoperative diagnostic is usually missed or delayed because of nonspecific symptoms. Abdominal CT is considered as the most sensitive imaging modality in the diagnosis of intussusceptions and can also be able to distinguish the presence or absence of a lead point.

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ORIGINAL ARTICLE

Emergency Room Physician Staffing to Patient Ratio

Narudee Srisang, M.D.

Department of Emergency Medicine and Forensic,
Khon Kaen Hospital, Khon Kaen, Thailand

ABSTRACT

OBJECTIVE

To determine the physician staffing to patient ratio at Emergency Department (ED)

METHODS

This is a cross-sectional study including 363 patients who visited at ED of Khon Kaen Hospital, Thailand in the period of April 2015. Period of time for each patient in ED was assessed to calculate the physician to patient ratio per hour.

RESULTS

ED stay times in patients with critical conditions (Level 1), patients with emergency illness (Level 2) and patients with acute illness were (Level 3) were 54, 74 and 97.5 minutes, respectively. By calculation we found that 1.9, 3.2, and 4.0 patients in Level 1, Level 2 and Level 3 were treated by one physician per hour. There were 121 patients (33.3%) who had an ED visit time of more than 2 hours and two factors which were found to be statistically significant associated with this were being in Level 3 (adjusted odds ratio (AOR), 3.14; 95% confidence interval (CI), 1.01 to 9.74) and being laboratory investigated (AOR, 4.50; 95% CI, 2.41 to 8.43).

CONCLUSION

Emergency room physician staffing to patient ratios in Level 1, 2 and 3 patients were 1.9, 3.2 and 4 patients per hour, respectively.

INTRODUCTION

Emergency department overcrowding means there are too many patients excessively the capability or resources available in the emergency department, hospital or both.¹ The emergency department overcrowding is a problem gradually encountering more and more and it arises rapidly when there are more patients coincidentally with the administration within the emergency department has not adequately and sufficiently managed.^{2,3} This results in disadvantage to patients' sickness conditions such as delay treatment.⁴⁻¹² Moreover, It is also found to be related to the occurrence of cardiac emergency in patients admitted in the hospital more and more and the mortal rate increased.^{13,16}

The emergency department overcrowding could be caused from three processes, namely, before entering into an emergency room, within emergency room and after discharge from emergency room.¹⁷ The process before entering into an emergency room means there are a great number of patients requiring to use emergency rooms while the process within emergency room includes patients screening, evaluation and procedure of diagnosis affecting to the duration the patient has to stay in an emergency room but the process after discharge from emergency room would crucially regard to the time the patient was carried out of the emergency room.¹⁷ Whereof the emergency room with high potentiality would have longer period of in-emergency room process but it would not allow the emergency department overcrowding.¹⁸ There had been studies, it was found that the emergency department overcrowding was arisen from increasing numbers of severe sick and critical patients.¹⁹

The important personnel herein the emergency room are physicians, they

should be provided in adequate number to be able to give treatment for patients in severe and critical conditions and to provide for the treatment movement continuing efficiently in standard management, to reduce risk and dissatisfaction of all parties, patient, relatives and medical operators. It was found that the adequate ratio should be 1.8–2 patients to physician per hour.²⁰ The cause enabling the lower rate of physician's examination and treatment than this always came from a great number of severe sick patients, high rate of in-patient admission, insufficiently experienced physicians and waiting duration for forwarding patients to a ward took a long time.²⁰ The American Academy of Emergency Medicine had stated that the physician to patients proportion depends upon the patient service acceptable rate which should not over 2.5 patients to physician per hour in group of patients with moderately emergency condition.²¹ Even though at present, there are widely studies on causes of emergency department overcrowding but there were limited studies on the adequate number of physicians necessary for giving treatment to emergent and critical patients. Besides, the study results had not reflect to the condition of Thailand which has a different public health system. This study therefore emphasized on the study of the number of physicians to the number of emergent and critical patients in general hospitals' context and on factors affecting patients retained in emergency rooms for a long time.

METHODS

This was a cross sectional research to find the adequate proportion or ratio of physician to a number of critical, emergent and urgent patients visited for treatment during 1-30 April 2015.

The Clinical Academia

The study was carried out at the Emergency Department, Khon Kaen Hospital, Thailand. It is a tertiary care hospital with 876 patient beds availability. Emergency patients were about 100,000 cases per year and the rate of in-patient admission from the Emergency Department was approximately 36.1 percent in 2015.²² The physicians practicing in emergency rooms were divided into four groups as follows: The first group are physician staff consisting of emergency physician (EP), various specialist, such as internal medicine, surgeon and pediatrician who are circulated to work on duty as out-official time physician. The second group are emergency medicine resident and intern. The third group are specific expert physicians alerted at the Emergency Department consisting of surgeons and orthopedic surgeons and the final group are the specific expert physicians called for to look after a patient (on call) such as, ophthalmologist, otolaryngologist and obstetrician and gynecologist.

Patients coming to get services at the Emergency Department will be screened and selected by experienced nurses according to the Emergency Severity Index (ESI)²³ Guideline which divides patients into 5 levels according to the disease severity, namely, Level 1, the critical patient; Level 2, emergency patient; Level 3, urgent patient; Level 4, less urgent patient and Level 5, general patient whereas Level 1-3 are regarded as the patients in emergency condition and Level 4-5 are regarded as non-severe sick people. All patients in emergency condition would be brought into the study. From the data of Emergency Department in 2014, it was found that the average duration patients in emergency room who had been and not had been performed urgent treatment, laboratory examination, radiological examination and consultation with specific expert physicians were 63 and 95 minutes respectively. Hence, if any patient spent period in emergency room for over 2 hours (120 minutes), that patient would be deemed over the acceptable criteria.

The data were collected by reviewing the retroactively medical registration from the database of Emergency Room Registry to get the following information; characteristic of patients, time of presenting, type of presenting, patient triage category, type of illness, waiting time for physician's examination, duration of emergency physician's examination, duration the patient staying in emergency room, emergency procedure, radiological examination, laboratory examination, specialist consultation, result of treatment at emergency room and health insurance. When patients had been screened and separated, they would be brought into the examination room, waiting to meet a physician according to their level of urgency. Patients would be examined by the physician, get treatment, forwarded for additional examination and sent to consult specialist as appropriate in each case whereas the duration the patient was in the emergency room was deemed the duration the patient was under the physician's care-taking. The treatment result was divided into admission for hospitalization, going home, refer to another hospital, forwarding to out-patient department and deceased at the emergency room. The sample size was calculated from the previous study made at the Emergency Department, Khon Kaen Hospital, it was found that it required sample size for 345 cases to be in 95 % confidence interval and 80 % testing power. The sampling was carried out in simple means with expectation that there might be 10% of data lost. Hence, in this study, 380 cases had been sampled and the data were presented in form of means, standard deviation, median and quartile range. The data were analyzed by to calculate for the crude odds ratio (COR) of factors delaying patients to be in an emergency room for longer time than 2 hours. All factors with $P < 0.05$ would be analyzed by binary logistic regression to calculate for the adjusted odds ratio (AOR) and its 95% confidence interval (CI). All data were analyzed using STATA Program, Version 11.0.

RESULTS

There were 8,117 patients visited at the Emergency Department during the studying interval. They were Level 1-3 emergency patients, totally 5,367 cases (66.1 %) and they were selected by random sampling for the study to a number of 380 cases (7.2 %). 17 patients (4.7%) were cut out because their data were incomplete. Therefore, there were total 363 patients brought into the analysis. They were found to be male 199 cases (54.8%), average age : 46.5 years, they came to the hospital by themselves to the number of 217 cases (59.8%), 144 (39.8%) and 142 (39.2%) patients came to get services at the time interval of 08.01 – 16.00 hours and 16.01 – 24.00 hours respectively. 170 patients (46.8%) were mostly found to be the patients of Level 2 emergency whereas 99 cases (27.3%) were injured, 203 cases (55.9%) were admitted as in-patients and 220 cases (60.6%) were universal coverage health insurance, as shown in Table 1.

It was found the waiting time for physician's examination were 0, 8 and 14 minutes for patients of Level 1,2 and 3 respectively. Duration for examination of each patient of Level 1, 2 and 3 were 31, 19 and 15 minutes, respectively. From the analysis of physician's examination period, it could be calculated that a physician could examine and give treatment to patients of Level 1, 2 and 3 to amount of 1.9, 3.2 and 4.0 patients per hour respectively or approximately 2, 3 and 4 cases per hour respectively. The duration a patient staying in emergency room (length of stay-LOS) for patients of Level 1,2 and 3 were 54, 74 and 97.5 minutes respectively. The Level 1 patients had mostly been done emergency procedure for 23 cases (51.1 %) and 42 cases (93.3%) were hospitalized as in patients. One third of analyzed patient number were in emergency room for longer than 2 hours, especially Level 3 patients of 64 cases (43.2%) as shown in Table 2.

Table 1. Characteristics of the Patients.

Characteristic	Value
Male-no. (%)	199 (54.8)
Age-yr	46.5±23.2
Types of presenting-no. (%)	
On their own	217 (59.8)
Referred	125 (34.4)
Emergency Medical Service (EMS)	21 (5.8)
Time of presenting-no. (%)	
08.01-16.00	144 (39.8)
16.01-24.00	142 (39.2)
00.01-08.00	76 (21.0)
Triage categories-no. (%)	
Level 1	45 (12.4)
Level 2	170 (46.8)
Level 3	148 (40.8)
Type of illness-no. (%)	
Trauma	99 (27.3)
Non trauma	264 (72.7)
Type of discharge-no. (%)	
Admission	203 (55.9)
Home	150 (41.3)
Out patient department	8 (2.2)
Against advice	2 (0.6)
Health insurance –no. (%)	
Universal Coverage	220 (60.6)
Government insurance	43 (11.8)
Self-payment	45 (12.4)
Social insurance	42 (11.6)
Vehicle act	11 (3.0)
Others	2 (0.6)

Plus minus values are mean plus minus standard deviation.

Table 2. Treatment outcome

Characteristic	Level 1	Level 2	Level 3	All
Median door to physician-min (IQR)	0 (0-1)	8 (5-12)	14 (9-16)	9 (4-14)
Median physician examination-min (IQR)	31 (26-36)	19 (14-25)	15 (14-19)	18 (14-25)
Median length of stay in department-min (IQR)	54 (45-63)	74 (32-131)	98 (60-163)	80 (40-149)
Emergency procedure-no. (%)	23 (51.1)	2 (1.2)	0	25 (6.9)
Admission-no. (%)	42 (93.3)	101 (59.4)	60 (40.50)	203 (55.9)
Length of stay in department >2 hours-no. (%)	7 (15.6)	50 (29.4)	64 (43.2)	121 (33.3)

Table 3. Factor Associated with Length of Stay at Emergency Department More than Two Hours

Characteristic	Stay 2 hours or shorter	Stay longer than 2 hours	Crude odds ratio	Adjusted odds ratio
Age-yr	47.1±23.9	45.3±21.7	0.99 (0.98-1.01)	
Triage category-no. (%)				
Level 1	38 (15.7)	7 (5.8)	1	1
Level 2	120 (49.6)	50 (41.3)	2.26 (0.94-5.40)	1.74 (0.57-5.30)
Level 3	84 (34.7)	64 (52.9)	4.14 (1.73-9.86)	3.14 (1.01-9.74)
Type of presenting-no. (%)				
On their own	141 (58.3)	76 (62.8)	1	1
Referred	92 (38.0)	33 (27.3)	0.66 (0.41-1.08)	1.41 (0.74-2.70)
Emergency medical services	9 (3.7)	12 (9.9)	2.47 (0.99-6.13)	2.41 (0.85-6.86)
Time to presenting-no. (%)				
08.01-16.00	91 (37.6)	53 (43.8)	1	
16.01-24.00	100 (41.3)	42 (34.7)	0.72 (0.44-1.18)	
00.01-08.00	51 (21.1)	26 (21.5)	0.84 (0.47-1.51)	
Trauma-no. (%)	72 (29.7)	27 (22.3)	0.68 (0.41-1.13)	
Median door to physical time-min (IQR)	8 (3-14)	10 (5-14)	0.99 (0.98 -1.02)	
Procedural treatment-no. (%)	22 (9.1)	3 (2.5)	0.25 (0.07-0.87)	0.76 (0.16-3.54)
Laboratory investigation-no. (%)	123 (50.8)	75 (72.0)	1.58 (10.1-2.46)	4.50 (2.41-8.43)
Radiological imaging-no. (%)	139 (57.4)	59 (48.8)	0.71 (0.45-1.09)	
Consultation-no. (%)	95 (39.2)	53 (43.8)	1.21 (0.78-1.88)	
Admission-no. (%)	156 (64.5)	47 (38.8)	0.35 (0.22-0.55)	0.17 (0.88-0.34)

Plus minus values are mean plus minus standard deviation.

It was found there were 5 factors; patient triage categories, type of presenting to ED, emergency procedure, forwarding for laboratory examination and in-patient admission had relation to the length of stay in emergency room over 2 hours where from two fifth of factors had relation to statistical significance when analyzed by Multivariate Logistic Regression, namely, for the Level 3 sickness severity, the AOR was 3.14 (95% CI, 1.01 to 9.74) and for forwarding for laboratory examination, the AOR was 4.50 (95% CI, 2.41 to 8.43). While the in-patients admission had relation to the length of stay in emergency room less or equal to 2 hours with statistical significance, the AOR was 0.17 (95% CI, 0.08 to 0.34) as shown in Table 3.

DISCUSSION

Patients who visited at the Emergency Department were different from the patients who came to get services at Out-patient Department, namely, this group of patients, especially the severe patients required many steps of disease diagnosis, needed many emergency procedures that took longer time for treatment. Simultaneously, it needed continuous evaluation or assessment, post-treatment activity by physician such as waiting for symptom observation, meeting or specialist consultation and waiting for result coming out of laboratory. These factors resulted in accumulation of patients in emergency rooms that reduced the area to support the newly coming patients and caused the emergency department overcrowding because the department had to give concurrent services to both previous patients and new patients.

From the study, it was found that even though the study was conducted specifically among only severe patients

coming to get services at the Emergency Department but it was found that in Khon Kaen, the proportion of physicians to the number of patients was more in quantity than that in the United States of America.^{20,21} This might be due to there were more patients in Thailand and different public health system. Hence, adoption of the foreign proportion to calculate for physician personnel load in emergency room in Thailand is unsuitable or even in Thailand itself, each level of hospital has its differently internal administration system that may result in variation of physician to patients proportion. Besides, it was also found that Level 1-3 patients stayed in an emergency room 80 minutes per case but when categorized by each level, it was found that Level 3 patients stayed longest time in an emergency room and they had the patients' most proportion staying in an emergency room for longer than 2 hours which, according to the screening criteria of ESI, the Level 3 patients were the ones who had constant symptom and needed examination, diagnosis and treatment at the Emergency Department to reduce admission of unnecessary.

Level 1 and 2 patients were the ones who had non-constant symptoms and high risk who needed admission for continuous treatment in hospital so they spent less time in emergency rooms and had more proportion to be admitted in the hospital. Appurtenant with the hospital's management system, the admission of patients could immediately be done so the patients needed not to wait within the emergency rooms, they could immediately be moved in when the physician ordered admission to be in-patients. It was found another factor relating to the length of stay of a patient in an emergency room other than the severity level of sickness, namely, forwarding for laboratory examination similarly to a previous study.²⁴

Due to forwarding for a specific laboratory examination, if there were several categories, it took time for waiting for the result to come out, at least 1-2 hours, this effected to the length of stay a patient had to be in an emergency room. But for admission to be an in-patient, it was found to result in opposite way, namely, the patient admitted to be an in-patient had less length of stay in emergency room, compared with other groups of patients with statistical significance that its result was opposite to many studies which found that admission to be in-patient resulted in patient's long stay in emergency room^{19,25} because there must be management of in-patient bed preparation to be able to admit the patient that this step took a long time. But Khon Kaen Hospital which is a tertiary hospital and the mother hub to receive forwarded patients from provinces in upper Northeastern Part of Thailand so it must be prepared to support patients necessary to get a suitably specific treatment, unlimitedly and proublemlessly on in-patient bed administration so patients could immediately forwarded from the Emergency Department to in-patient ward without delay when the treatment at emergency room had been finished.

The limitation of this study were, firstly, the study had been conducted at only one hospital that its result may not be applicable with another hospital with different context of services. Secondly, due to the studying data obtained from the database of Emergency Room Registry that the time of receiving records in case the patients were admitted as in-patients would be recorded to prepare the patient's

document before movement of the patient out of emergency room, hence, the time which the patient left the emergency room would be sooner than actuality which affected to the length of stay of the patient in the emergency room. Thirdly, it was the study conducted within an interval of time which in fact, the number of patients may vary or be different in each season and the physician's potential may be different, especially in the interval when emergency medicine resident and intern with less experience were on new working that resulted in physician's examination period or length of patient's stay in an emergency room. Hence, there should be additional studies to cover every interval of all year round and in the public health service in each level in the next study so as to be benefit in organization of appropriate physician personnel list rate to give services to patients. It can be summarized that in patients of critical, emergent and urgent groups who entered to get medical treatment at the Emergency Department had the physician to number of patients proportion equal to 1 to 2, 3 and 4 patients per hours respectively.

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Correlation between the Predicted Range of Weight from Pediatric Triage Tape and the Actual Weight

Ratrawee Pattanarattanamolee M.D.

Department of Emergency Medicine and Forensic,
Khon Kaen Hospital, Khon Kaen, Thailand

ABSTRACT

OBJECTIVE

The primary outcome was correlation between the predicted range of weight from pediatric triage tape (PTT) and the actual weight.

METHODS

A cross-sectional study was performed in child between 0-12 years in the urban area of Khon Kaen. Children shorter than 50 cm and malnutrition that effect in growth was excluded. The actual weight was compared to the predicted range of weight from PTT in percentage of correct prediction. Correlation was demonstrated by Bland-Altman plot

RESULTS

A total of 661 healthy children were included in this study. The study showed that the percentage of accurate prediction of range 50-80 cm, 80.01-100 cm, 100.01-140cm were 89% (95% confidence interval (CI), 82.7 to 93.3), 84.5% (95% CI, 74.3 to 88.7), 56.6 (95% CI, 51.5 to 62.2), respectively. The correlation of mean different and average of midpoint of the predicted range of weight from PPT in range 50 to 80 cm were -3.24 (95% CI, -7.84 to 1.36); range 80.01-100 cm was 0.46 (95% CI, --4.37 to 5.29); range 100.01-140 cm was 0.29 (95% CI, -15.30 to 15.88)

CONCLUSION

Pediatric triage tape was reliable and correlated to predict body weight of the children in the range of 50-80 cm and 80.01-100 cm of PTT.

INTRODUCTION

The triage in disaster situations is an important step in managing situations with limited medical resources.¹⁻⁴ Normally, we will do the field triage at the field spot and a secondary triage at the point of treatment and subsequent to the standard treatment.¹⁻³ The first triage at the field spot for adult we use the triage sieve, a rough estimate based on the prototype stage.²⁻³ The integrity of the respiratory tract, respiration rate should be between 10-29 times per minute. The circulation of the blood, as measured by heart rate, should not over 120 beats per minute or less than two seconds by capillary refill.²⁻³ In pediatric patients will vary according to the age⁵ as shown in Table 1. Knowing their age and weight might not be possible during casualty. In 1998, there was a tool for screening pediatric patients with injuries; Pediatric Triage Tape (PTT).⁶ This tape can be used to determine the child's height or weight by measure the height. This tool has studied precision in the western population but it has never been used in Thai children. The research team realized the importance and necessity of developing such tools to be consistent with the context of Thailand.

METHODS

This was a cross-sectional survey study in the urban area of Khon Kaen between August and September 2015. We included A group of children from birth to age of 12 years using simple random sampling. We excluded those shorter than 50 cm, being ill or with disability which affects body weight and height i.e., disabled dwarf and neurological disorders that affect growth. Sample size was calculated from a pilot study using a sample of 20 people who

Table 1. Heart and Respiratory Rate by Age.

Age-yr	Heart rate/min	Respiratory rate/min
<1	110-160	30-40
2-5	95-140	25-30
6-12	80-120	20-25
>12	60-100	15-20

came to the Emergency Department of Khon Kaen Hospital. The required sample for this study was 323 children.

The research team gave the informed consent to the governor of the children and school administrators before commencing the study. Children who were studying at schools or nurseries were eligible to join the study whom were weighed and measured height and recorded for weight (kg), height (cm), date of birth, gender and date of recording. From the data obtained, the researcher used PTT to predict the range of weight from height of each child. The result was recorded in a computer database.

General characteristics were described using descriptive statistics. Continuous data such as age, weight, height and weight for height were described in mean, standard deviation, median and range where appropriate. For the categorical data such as gender, they were described in term of frequency and percentage. The accurate prediction of PTT in each the range of weight compared to actual weight was described in the estimation of proportion and 95% confidence interval (CI) of proportion. The correlation between the midpoint of the range of weight from PTT and the actual weight was described in limit of agreement (LOA) which report by mean difference and 95% CI of mean difference and graph Bland- Altman Plot.^{7,8}

Table 1. Characteristics of the Participants.

Characteristics	Value
Male-no. (%)	368 (55.7)
Age-yr-no. (%)	
Less than 1	115 (17.4)
1-2	119 (18.0)
3-4	180 (27.2)
5-12	247 (37.4)
Mean \pm SD	4.4 \pm 3.4
Median (range)	4.0 (0-12)
Height-cm-no. (%)	
50-80	152 (23.0)
80.1-100	119 (18.0)
100.1-140	359 (54.3)
>140	31 (4.7)
Mean \pm SD	103.2 \pm 26.1
Median (range)	107 (50-146)
Weight for height-no. (%)	
Obese	38 (5.7)
Overweight	63 (9.5)
Portly	27 (4.2)
Slender	482 (72.8)
Underweight	32 (4.8)
Thin	19 (2.9)
Mean \pm SD	19.5 \pm 10.9
Median (range)	17.9 (2.5-66.0)

Plus minus values are mean plus minus standard deviation.

RESULTS

There were 667 children from birth to 12 years old, included in study and 6 children were excluded (Figure 1). The rest were divided into three groups by the range of height from the PTT (Figure 1). Those with height more than 140 cm were considered as the adults. The participants in the present study consisted of male (55.7%) female (44.3%), more details of patient characteristics were presented in Table 1.

Table 2 shows characteristics of the participants regarding three categories of PTT. Comparing between actual weight of the participants and the predicted range of weight from PTT, it showed that the accurate prediction that in the range of 50-80 cm was 89% (95% CI, 82.7 to 93.3), in the range of 80.01-100 cm was 82% (95% CI, 74.3 to 88.7) and in the range of 100.01-140 cm was 56.6% (95% CI, 51.5 to 62.2).

The different of the midpoint of the predicted range of weight and actual weight was compared to the average of actual weight and the midpoint of the predicted range of weight from PTT. The analysis showed that in the range of 50-80 cm the mean difference, 95% of the LOA was -7.84 to 1.36. More details in the other ranges of PTT were presented in Table 3.

Figure 2 is the Bland-Altman Plot. It shows the average and the different of data on line of agreement and its distribution in the range of 95% CI of LOA.

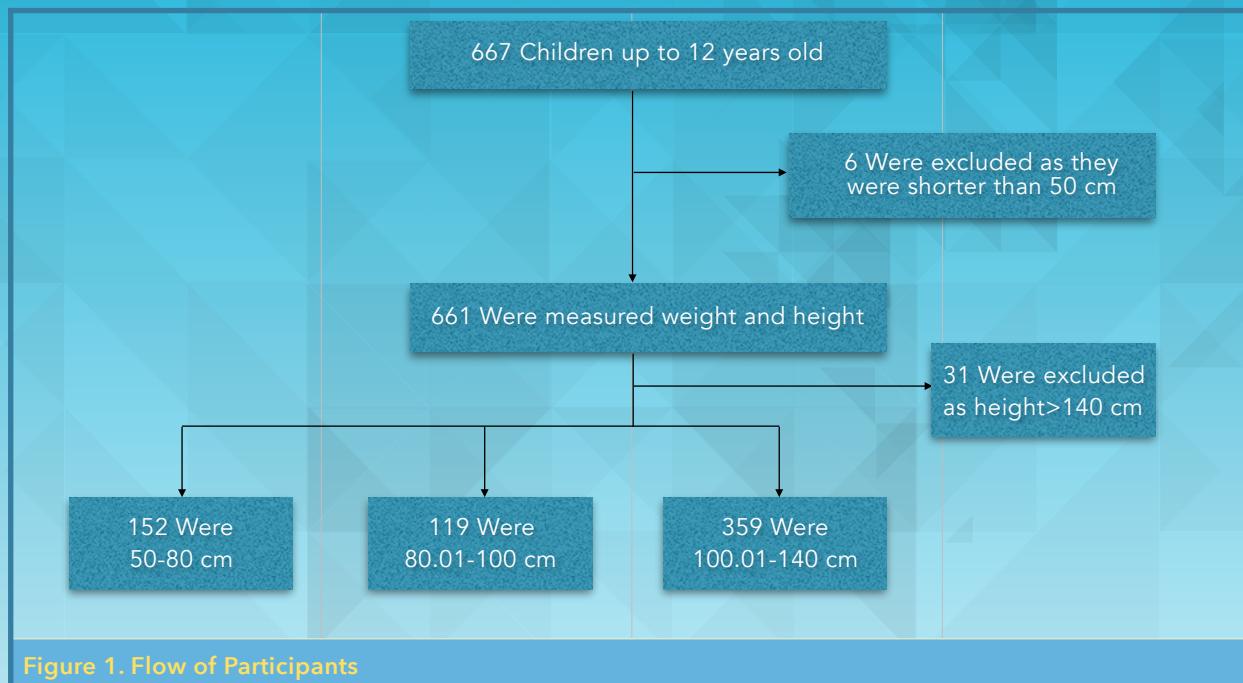


Figure 1. Flow of Participants

Table 2. Characteristics of the Participants Regarding Paediatric Triag Tape

Characteristic	50-80 cm	80.01-100 cm	100.01-140 cm
Male-no. (%)	90 (59.2)	66 (55.5)	192 (55.5)
Age-month	0.9±0.6	5.1±3.5	7.2 ±2.1
Weight-kg	7.2±2.3	13.5±2.4	24.71±7.8
Height-cm	65.6±6.7	90.7±5.8	119.7±11.5

Plus minus values are mean plus minus standard deviation.

Table 3. Prediction and Limit of Agreement Paediatric Triag Tape

Value	50-80 cm	80.01-100 cm	100.01-140 cm
Actual weight	7.2±2.3	13.5±2.4	24.7±7.8
Number of accurate prediction	135	98	196
Accurate prediction (%)	89.0	82.4	56.6
95% confidence interval of accuracy	82.7 to 93.3	74.3 to 88.7	51.5 to 62.2
Mide point of weight range by PTT	4	14	25
Limit of agreement	-3.24	0.46	0.29
95% confidence interval of LOA	-7.84 to 1.36	-4.37 to 5.29	-15.30 to 15.88

Plus minus values are mean plus minus standard deviation.

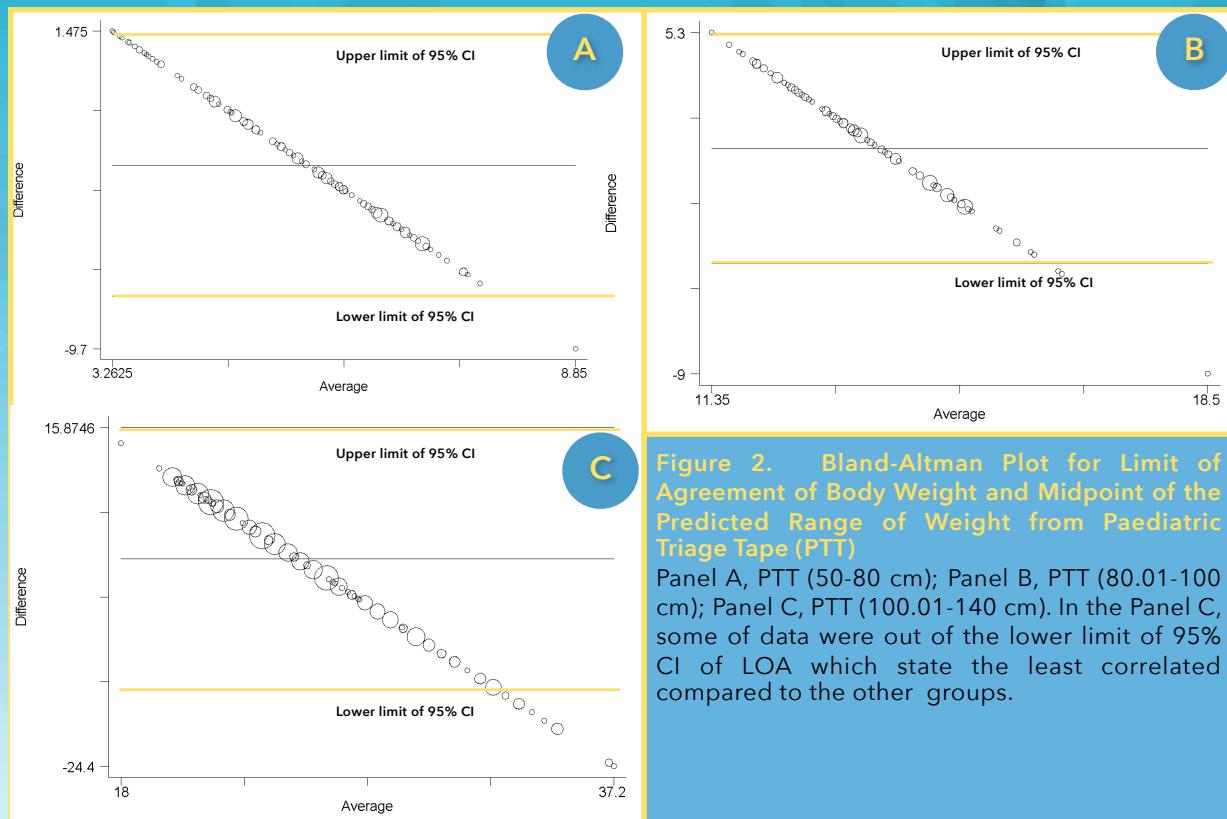


Figure 2. Bland-Altman Plot for Limit of Agreement of Body Weight and Midpoint of the Predicted Range of Weight from Paediatric Triage Tape (PTT)

Panel A, PTT (50-80 cm); Panel B, PTT (80.01-100 cm); Panel C, PTT (100.01-140 cm). In the Panel C, some of data were out of the lower limit of 95% CI of LOA which state the least correlated compared to the other groups.

DISCUSSION

The study showed that PTT was able to predict the actual weight of the population, especially in the range of 50-80 cm and 80.01-100 cm and the data analysis showed significant correlation in that group but less correlation in the range of 100.01-140 cm. Researchers have noted about nutritional situation as Thai population has children who are overweight.^{9,10} In the subgroup analysis in the range of 100.01-140 cm, the accurate prediction between the correct prediction group and the incorrect prediction group was 31.6% and 40.7%, respectively which stated no significant difference. The percentage of the accurate prediction in the range of height 100.01-140

cm lower than the other may be due to physiological and nutritional status of different populations that PTT creator studied (Europe's population).⁶ The study by Chaiyaporn Yuksen et al found Broselow® Tape, based on European populations, were some wrong predictions the weight of Thai people.¹¹⁻¹² Limitations in this study was that our sample lived only in urban areas. There may be a difference in the body, nutritional status, food culture and the we studied only in Khon Kaen.

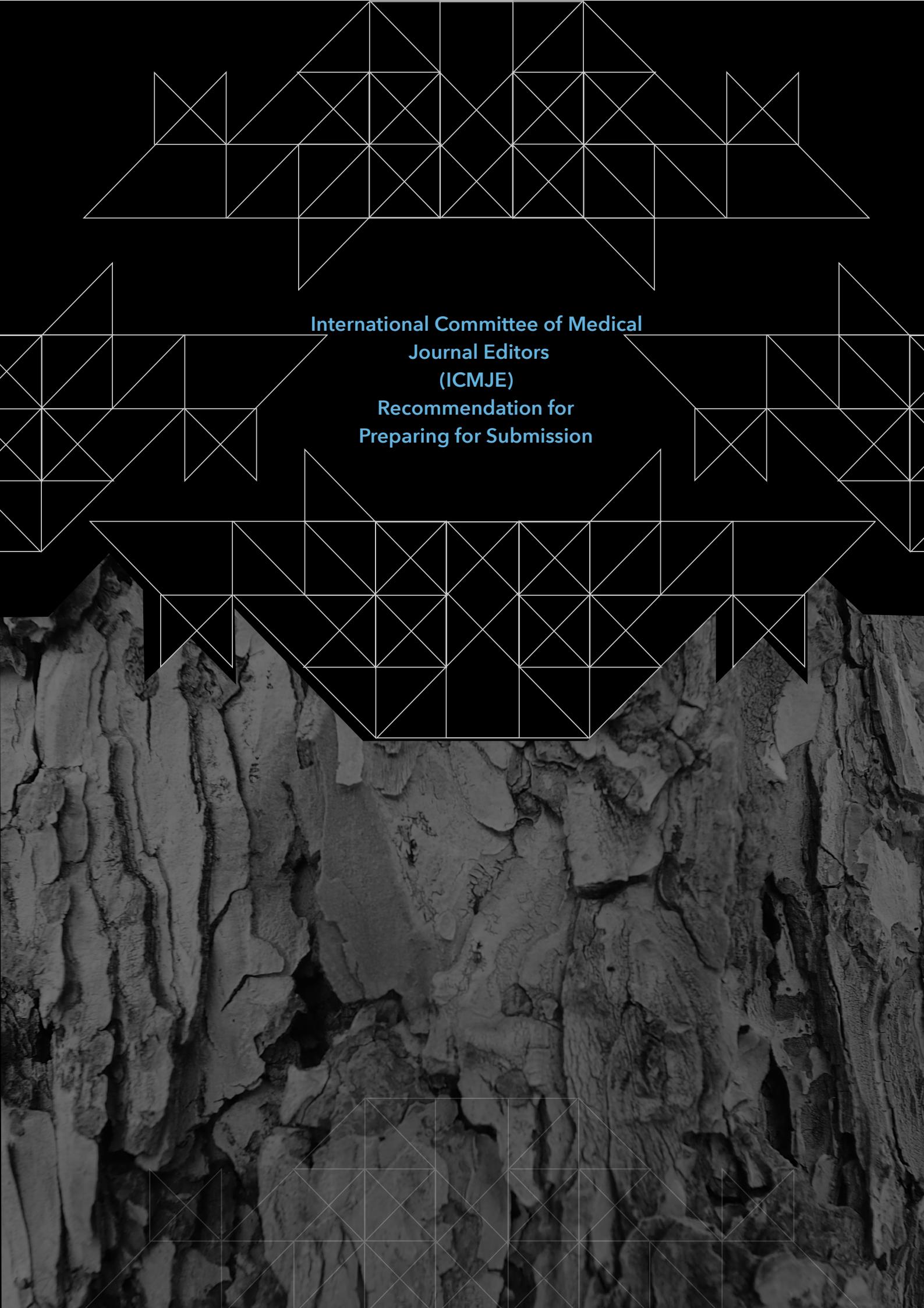
In conclusion, pediatric triage tape might be reliable and correlated to predict body weight of casualty in Thai population. Suggestions for further studies in a larger and wider population was recommended in order to adjust a range of tools to suit Thai population.

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**International Committee of Medical
Journal Editors
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**Recommendation for
Preparing for Submission**

1. General Principles

The text of articles reporting original research is usually divided into Introduction, Methods, Results, and Discussion sections. This so-called "IMRAD" structure is not an arbitrary publication format but a reflection of the process of scientific discovery. Articles often need subheadings within these sections to further organize their content. Other types of articles, such as meta-analyses, may require different formats, while case reports, narrative reviews, and editorials may have less structured or unstructured formats.

Electronic formats have created opportunities for adding details or sections, layering information, cross-linking, or extracting portions of articles in electronic versions. Supplementary electronic-only material should be submitted and sent for peer review simultaneously with the primary manuscript.

2. Reporting Guidelines

Reporting guidelines have been developed for different study designs; examples include CONSORT for randomized trials, STROBE for observational studies, PRISMA for systematic reviews and meta-analyses, and STARD for studies of diagnostic accuracy. Journals are encouraged to ask authors to follow these guidelines because they help authors describe the study in enough detail for it to be evaluated by editors, reviewers, readers, and other researchers evaluating the medical literature. Authors of review manuscripts are encouraged to describe the methods used for locating, selecting, extracting, and synthesizing data; this is mandatory for systematic reviews. Good sources for reporting guidelines are the EQUATOR Network and the NLM's Research Reporting Guidelines and Initiatives.

3. Manuscript Sections

The following are general requirements for reporting within sections of all study designs and manuscript formats.

a. Title Page

General information about an article and its authors is presented on a manuscript title page and usually includes the article title, author information, any disclaimers, sources of support, word count, and sometimes the number of tables and figures.

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b. Abstract

Original research, systematic reviews, and meta-analyses require structured abstracts. The abstract should provide the context or background for the study and should state the study's purpose, basic procedures (selection of study participants, settings, measurements, analytical methods), main findings (giving specific effect sizes and their statistical and clinical significance, if possible), and principal conclusions. It should emphasize new and important aspects of the study or observations, note important limitations, and not overinterpret findings. Clinical trial abstracts should include items that the CONSORT group has identified as essential. Funding sources should be listed separately after the Abstract to facilitate proper display and indexing for search retrieval by MEDLINE.

Because abstracts are the only substantive portion of the article indexed in many electronic databases, and the only portion many readers read, authors need to ensure that they accurately reflect the content of the article. Unfortunately, information in abstracts often differs from that in the text. Authors and editors should work in the process of revision and review to ensure that information is consistent in both places. The format required for structured abstracts differs from journal to journal, and some journals use more than one format; authors need to prepare their abstracts in the format specified by the journal they have chosen.

The ICMJE recommends that journals publish the clinical trial registration number at the end of the abstract. The ICMJE also recommends that, when a

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c. Introduction

Provide a context or background for the study (that is, the nature of the problem and its significance). State the specific purpose or research objective of, or hypothesis tested by, the study or observation. Cite only directly pertinent references, and do not include data or conclusions from the work being reported.

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Clearly describe the selection of observational or experimental participants (healthy individuals or patients, including controls), including eligibility and exclusion criteria and a description of the source population. Because the relevance of such variables as age, sex, or ethnicity is not always known at the time of study design, researchers should aim for inclusion of representative populations into all study types and at a minimum provide descriptive data for these and other relevant demographic variables. If the study was done involving an exclusive population, for example in only one sex, authors should justify why, except in obvious cases (e.g., prostate cancer)." Authors should define how they measured race or ethnicity and justify their relevance.

ii. Technical Information

Specify the study's main and secondary objectives—usually identified as primary and secondary outcomes. Identify methods, equipment (give the manufacturer's name and address in parentheses), and procedures in sufficient detail to allow others to reproduce the results. Give references to established methods, including statistical methods (see below); provide references and brief descriptions for methods that have been published but are not well-known; describe new or substantially modified methods, give the reasons for using them, and evaluate their limitations. Identify precisely all drugs and chemicals used, including generic name(s), dose(s), and route(s) of administration. Identify appropriate scientific names and gene names.

iii. Statistics

Describe statistical methods with enough detail to enable a knowledgeable reader with access to the original data to judge its appropriateness for the study and to verify the reported results. When possible, quantify findings and present them with appropriate indicators of measurement error or uncertainty (such as confidence intervals). Avoid relying solely on statistical hypothesis testing, such as P values, which fail to convey important information about effect size and precision of estimates. References for the design of the study and statistical methods should be to standard works when possible (with pages stated). Define statistical terms, abbreviations, and most symbols. Specify the statistical software package(s) and versions used. Distinguish prespecified from exploratory analyses, including subgroup analyses.

e. Results

Present your results in logical sequence in the text, tables, and figures, giving the main or most important findings first. Do not repeat all the data in the tables or figures in the text; emphasize or summarize only the most important observations. Provide data on all primary and secondary outcomes identified in the Methods Section. Extra or supplementary materials and technical details can be placed in an appendix where they will be accessible but will not interrupt the flow of the text, or they can be published solely in the electronic version of the journal.

Give numeric results not only as derivatives (for example, percentages) but also as the absolute numbers from which the derivatives were calculated, and specify the statistical significance attached to them,

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Separate reporting of data by demographic variables, such as age and sex, facilitate pooling of data for subgroups across studies and should be routine, unless there are compelling reasons not to stratify reporting, which should be explained.

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It is useful to begin the discussion by briefly summarizing the main findings, and explore possible mechanisms or explanations for these findings. Emphasize the new and important aspects of your study and put your findings in the context of the totality of the relevant evidence. State the limitations of your study, and explore the implications of your findings for future research and for clinical practice or policy. Do not repeat in detail data or other information given in other parts of the manuscript, such as in the Introduction or the Results section.

Link the conclusions with the goals of the study but avoid unqualified statements and conclusions not adequately supported by the data. In particular, distinguish between clinical and statistical significance, and avoid making statements on economic benefits and costs unless the manuscript includes the appropriate economic data and analyses. Avoid claiming priority or alluding to work that has not been completed. State new hypotheses when warranted, but label them clearly.

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References should follow the standards summarized in the NLM's International Committee of Medical Journal Editors (ICMJE) Recommendations for the Conduct, Reporting, Editing and Publication of Scholarly Work in Medical Journals: Sample References webpage and detailed in the

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Tables capture information concisely and display it efficiently; they also provide information at any desired level of detail and precision. Including data in tables rather than text frequently makes it possible to reduce the length of the text.

Prepare tables according to the specific journal's requirements; to avoid errors it is best if tables can be directly imported into the journal's publication software. Number tables consecutively in the order of their first citation in the text and supply a title for each. Titles in tables should be short but self-explanatory, containing information that allows readers to understand the table's content without having to go back to the text. Be sure that each table is cited in the text.

Give each column a short or an abbreviated heading. Authors should place explanatory matter in footnotes, not in the heading. Explain all nonstandard abbreviations in footnotes, and use symbols to explain information if needed. Symbols may vary from journal to journal (alphabet letter or such symbols as *, †, ‡, §), so check each journal's instructions for authors for required practice. Identify statistical measures of variations, such as standard deviation and standard error of the mean.

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Additional tables containing backup data too extensive to publish in print may be appropriate for publication in the electronic version of the journal, deposited with an archival service, or made available to readers directly by the authors. An appropriate statement should be added to the text to inform readers that this additional information is available and where it is located. Submit such tables for consideration with the paper so that they will be available to the peer reviewers.

i. Illustrations (Figures)

Digital images of manuscript illustrations should be submitted in a suitable format for print publication. Most submission systems have detailed instructions on the quality of images and check them after manuscript upload. For print submissions, figures should be either professionally drawn and photographed, or submitted as photographic-quality digital prints.

For X-ray films, scans, and other diagnostic images, as well as pictures of pathology specimens or photomicrographs, send high-resolution photographic image files. Since blots are used as primary evidence in many scientific articles, editors may require deposition of the original photographs of blots on the journal's website.

Although some journals redraw figures, many do not. Letters, numbers, and symbols on figures should therefore be clear and consistent throughout, and large enough to remain legible when the figure is reduced for publication. Figures should be made as self-explanatory as possible, since many will be used directly in slide presentations. Titles and detailed explanations belong in the legends—not on the illustrations themselves.

Photomicrographs should have internal scale markers. Symbols, arrows, or letters used in photomicrographs should contrast with the background. Explain the internal scale and identify the method of staining in photomicrographs.

Figures should be numbered consecutively according to the order in which they have been cited in the text. If a figure has been published previously, acknowledge the original source and submit written permission from the copyright holder to reproduce it. Permission is required irrespective of authorship or publisher except for documents in the public domain.

In the manuscript, legends for illustrations should be on a separate page, with Arabic numerals corresponding to the illustrations. When symbols, arrows, numbers, or letters are used to identify parts of the illustrations, identify and explain each one clearly in the legend.

j. Units of Measurement

Measurements of length, height, weight, and volume should be reported in metric units (meter, kilogram, or liter) or their decimal multiples.

Temperatures should be in degrees Celsius. Blood pressures should be in millimeters of mercury, unless other units are specifically required by the journal.

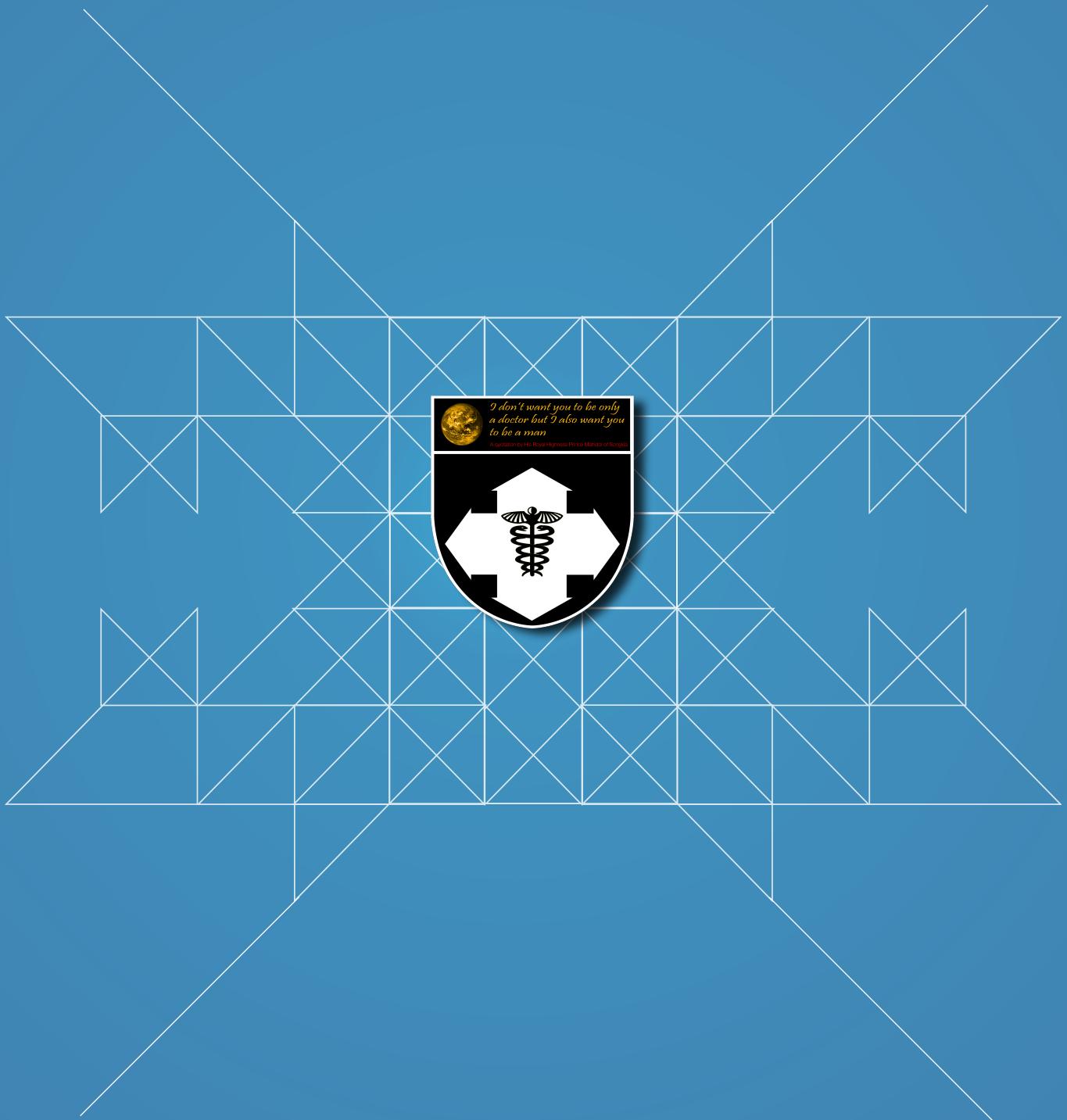
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Editors may request that authors add alternative or non-SI units, since SI units are not universally used. Drug concentrations may be reported in either SI or mass units, but the alternative should be provided in parentheses where appropriate.

k. Abbreviations and Symbols

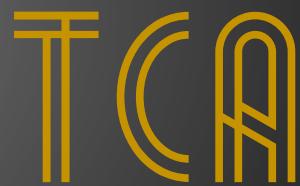
Use only standard abbreviations; use of nonstandard abbreviations can be confusing to readers. Avoid abbreviations in the title of the manuscript. The spelled-out abbreviation followed by the abbreviation in parenthesis should be used on first mention unless the abbreviation is a standard unit of measurement.





*I don't want you to be only
a doctor but I also want you
to be a man*

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