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Educational Forum

Introduction of a safety checklist for gynecological laparoscopy

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ABSTRACT

This study focuses on the importance of a safety checklist for gynecological laparoscopic surgeries. There is no dedicated safety check list for gynecological laparoscopy although several general safety checklists are used in practice. (e.g. WHO safety check list). The aim was to introduce a safety check list dedicated to gynecological laparoscopy. This check list is based on our experience in performing gynecological laparoscopy in a tertiary care centre with a high workload. This check list is introduced after studying the complications occurring in areas covered by the check list. Present data from 776 cases performed over 4 years at professorial unit in obstetrics and gynecology, university of Sri Jayewardenepura, Colombo South teaching hospital, Kalubowila, Sri Lanka. Mean surgical time and complications associated with patient positioning were assessed. Complications associated with the areas assessed were found to be low. However, it is belief that these can be further reduced by the introduction of a check list specifically designed for gynecological laparoscopy.

Keywords: Safety checklist, Gynaecological laparoscopy, Gynaecological endoscopy

INTRODUCTION

Gynecological laparoscopy has become advanced and gained popularity in recent times. It offers a wide range of benefits such as early return to work, fewer requirements of post-operative analgesia and cosmetic advantages to name a few.[1] However, in more complex and extended surgeries, these advantages are undermined by the longer duration of time taken to perform them laparoscopically. This is related to the patient being in a non-physiological position for a longer duration of time, prolonged anesthesia and other complications such as deep vein thrombosis.[2]

Almost all gynecological laparoscopies are conducted in a special steep Trendelenburg position, or otherwise named as the Lloyd Davies position. The position itself has its own complications such as lower limb compartment syndrome, and hence has evolved over time into the "modified Lloyd Davies" position in order to overcome these problems. However, various position related injuries are still encountered.[3]

Common position related injuries include but are not limited to rhabdomyolysis, nerve injuries which may be transient neuropraxia or rarely permanent, red eye, backache and headache especially at the occiput. Among them, nerve injuries account for vast majority of the cases due to prolonged surgical time.

The ulnar nerve is frequently impinged when the arm is in a pronated position with the patient in supine position. In addition, brachial plexus injuries can occur due to shoulder braces. Injury to the common peroneal and saphenous nerves can also occur due to prolonged use of leg stirrups.[4]

Continuous and methodical approach to patient safety in carrying out complex and prolonged interventions is the cornerstone of risk management strategies in gynecological laparoscopy.[5]

In order to meet the objectives of patient safety, the WHO has introduced a WHO safety checklist, which has proven effective in reducing surgical morbidity, mortality and improving communication and teamwork.[6,7] However, this check list is a more general approach to all surgeries and not specific to laparoscopy or gynecological laparoscopy.

Considering the special safety measures related to laparoscopy, some studies has proven that integrated operating rooms and pre-operative online checklists are effective in reducing some of the intraoperative laparoscopy related complications. These were conducted in other surgical disciplines and were not specific to gynecological procedures which have its own position related complications.[8] In addition, some surgeons raise questions regarding its applicability on a wider context, as certain surgeries may require comprehensive checklists which are specific to the particular surgery being performed.[9]

Some studies focused on technical aspects and introduced structured checklists related to equipment.[10] But these studies failed to demonstrate efficacy in preventing complications related to advanced laparoscopic procedures.

Prolonged surgical time is common to both laparoscopic and robotic surgeries. However, robotic surgeries have other characteristics; the surgeon's position is more distant from the patient, obscuration of the patient by robotic arms and extended draping. Therefore, this requires frequent reviews of the patient. Keeping this in mind, safety checklists which are unique to robotic surgeries have been put forward and have been shown to be effective.[2]

Gynecological laparoscopy has seen rapid progress in recent times. Prolonged surgeries involving the pelvis, such as that for endometriosis, are being performed effectively with the use of laparoscopy. Characteristics of these surgeries include patient positioning (the modified Lloyd Davies position), port placement towards the pelvis and safety measures to displace the bowel off the surgical field.

However, taking current existing evidence into account, there are no safety checklists specifically for gynecological laparoscopy. Conducted an audit to identify unique complications related to advanced gynecological procedures. This manuscript is compiled with the purpose of introducing a safety checklist for such procedures by utilizing expertise in performing advanced gynecological laparoscopy spanning over a decade.

METHODS

Laparoscopic safety checklist

Safety measures in laparoscopy focus on several aspects, the most important of which is the pre-operative head to toe examination of the patient (Figure 1).

The check list begins at the head, where the correct placement of the head ring is noted. This ring is preferably of soft material, which will provide a cushioning effect and therefore prevents position related injuries to the head. These are mainly contusions over the occiput and post-operative headache.

Prolonged laparoscopic procedures lead to various complications related to the eyes, such as dry eyes, red eyes, conjunctival oedema and severe irritation, which can easily be prevented by applying eye pads. Soft gauze swabs secured using a plaster can be used in a low resource setting.

The next factor to be considered is the insertion of a nasogastric tube ideally prior to endo-tracheal intubation, if palmer's point entry is planed due to past surgery. It prevents inadvertent entry into the stomach. Proper communication and co-ordination with the anesthetist are paramount as it is easier for the anesthetist to insert a nasogastric tube prior to endo-tracheal intubation.

Arms should be safety placed alongside the patient's body and secured using specially made straps or simply by wrapping them with a folded sheet. In addition, the surgeon should ensure adequate spacing between the arms and the body and also be mindful of the arms being pressurized by metal parts of the theatre table to prevent contusions and necrosis of the fingers.

The next essential step would be to ensure proper placement of the shoulder guard. It is vital to see that it is not placed over the acromial bony prominences in order to prevent mechanical type of shoulder pain following a prolonged surgery. Ideally, they should be placed bilaterally, but if the resources are limited, it should be placed at the side of the assistant, allowing the surgeon to move more freely. Gel pads should be placed underneath the shoulder guards.

The surgeon should also ensure adequate spacing between the neck and the shoulder, which helps to prevent neck pain as well as brachial plexus injuries.

Since most of the gynecologists opt to approach the patient from the left, the left arm of the patient should be placed safely alongside the body while the intravenous access is from a canula placed on the right arm. This arm is placed on an arm rest and can be placed at a comfortable anatomically correct angle to the patient's body.

As demonstrated in figure 2, arm should be bent slightly to facilitate anatomically correct positioning and assistant stands behind arm rest during surgery (Figure 2).

Next, both of the legs should be placed on pneumatic adjustable stirrups. Where these are unavailable and when conventional leg rests are used, lower side of the knees and ankles should be protected by gel pads. Pneumatic compression stockings should be used and applied appropriately prior to commencement of prolonged surgery in order to prevent deep vein thrombosis.

Diathermy pads should be placed properly to prevent burn injuries. It should be placed over a highly vascular muscle mass away from bony prominences. Return electrode monitoring system of the pads will detect any form of detachment as a result of an increase in impedance in the attachment area. In gynecological laparoscopy, the most convenient site is the upper thigh.

Bladder catheterization or emptying of the bladder prior to abdominal entry also account for safety measures by reducing the likelihood of entry related bladder injuries.

It is essential to ensure the availability of a multi-disciplinary team prior to commencing advanced gynecological laparoscopy. The team should essentially include a colorectal surgeon and a genitourinary surgeon.

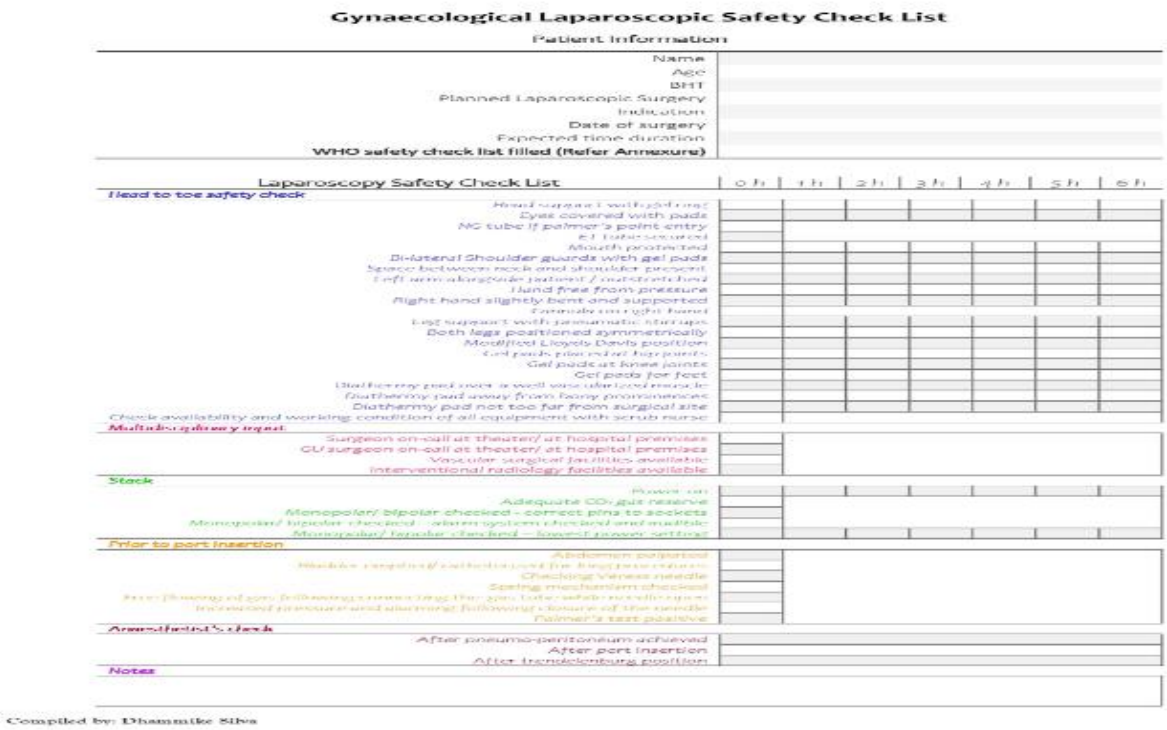
Finally, checking of laparoscopic stack and instruments should also be made part of the safety checklist, and this has been addressed by other studies as well.[10]

Primary survey of a clinical audit

The purpose of this manuscript is to present the primary survey of a clinical audit that emphasizes the introduction of a laparoscopic safety checklist, conducted at the Colombo South teaching hospital, Kalubowila, Sri Lanka. The study population of this audit comprises of all the laparoscopic surgeries conducted at the aforementioned hospital from January 2016 to January 2020. It is of importance to note that all the surgeries were conducted by one surgeon, which excludes inter operator bias. A total of 776 patients were analysed and the data was gathered from an electronic database. Mean surgical time and the Standard Deviation was analysed amongst the various types of surgical procedures, as it is the key determining factor in position related complications. A re-audit for this novel safety checklist is expected to be performed over the next 4 years from the time of implementation.

RESULTS

Mean surgical time for deep infiltrating endometriosis and adhesiolysis was 190.80 (SD±41.68) minutes. The mean surgical time for the other major surgeries were laparoscopic Sacro colpopexy 148 (SD±36.23), Burch colposuspension 108.60 (SD±26.32) and ureteric reimplantation 138.30 (SD±35.37).



Gynaecological Laparoscopic Safety Check List

Patient Information

Name
Age
BHT
Planned Laparoscopic Surgery
Indication
Date of surgery
Expected time duration
WHO safety check list filled (Refer Annexure)

Laparoscopy Safety Check List | 0 h | 1 h | 2 h | 3 h | 4 h | 5 h | 6 h

Head to toe safety check
Head support with gel ring
Eyes covered with pads
NG tube if palmer's point entry
ET tube secured
Mouth protected
Bi-lateral Shoulder guards with gel pads
Space between neck and shoulder present
Left arm alongside patient / outstretched
Hand free from pressure
Right hand slightly bent and supported
Cannula on right hand
Leg support with pneumatic stirrups
Both legs positioned symmetrically
Modified Lloyds Davis position
Gel pads placed at hip joints
Gel pads at knee joints
Gel pads for feet
Diathermy pad over a well vascularized muscle
Diathermy pad away from bony prominences
Diathermy pad not too far from surgical site
Check availability and working condition of all equipment with scrub nurse

Multidisciplinary input
Surgeon on-call at theater/ at hospital premises
GU surgeon on-call at theater/ at hospital premises
Vascular surgical facilities available
Interventional radiology facilities available

Stack
Power on
Adequate CO_2 gas reserve
Monopolar/ bipolar checked - correct pins to sockets
Monopolar/ bipolar checked - alarm system checked and audible
Monopolar/ bipolar checked – lowest power setting

Prior to port insertion
Abdomen palpated
Bladder emptied/ catheterized for long procedures
Checking Veress needle
Spring mechanism checked
[illegible]
[illegible]
Palmer's test positive

Anaesthetist's check
After pneumo-peritoneum achieved
After port insertion
After trendelenburg position

Notes

Compiled by: Dhammike Silva

Figure 1: Gynaecological laparoscopic safety check list

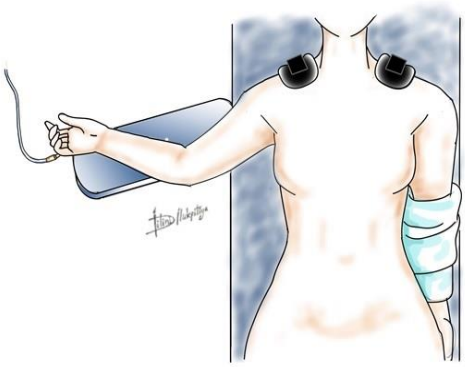


Figure 2: Positioning of arms and shoulder guards.

Table 1: Distribution of the type of gynecological laparoscopic surgeries and mean surgical time.

Type of gynecological laparoscopic surgeries	N	Mean surgical time (min) (SD)
Surgeries for deep infiltrating endometriosis/adhesiolysis	42	190.80 (41.68)
Ureteric re-implantation	4	138.30 (35.37)
Sacro-colpopexy	22	148 (36.23)
Burch colposuspension	5	108.60 (26.32)
Myomectomy and adenomyomectomy	82	86.35 (51.91)
Total laparoscopic hysterectomy	288	60.8 (27.26)
Cystectomy for endometrioma	209	81.8 (26.44)
Cystectomy for other types of adnexal cysts	124	72.34 (26.64)

Table 2: Complications linked to areas addressed by the safety check list.

Complication	N (%)
Contusions over the occiput	12 (0.015)
Headache	28 (0.037)
Dry eyes	16 (0.021)
Red eyes, conjunctival oedema	34 (0.044)
Inadvertent entry into stomach	2 (0.002)
Contusions of fingers	3 (0.003)
Shoulder pain	46 (0.060)
Neck pain	32 (0.042)
Backache	39 (0.051)
Neuropraxia of nerves of upper limbs	28 (0.037)
Permanent nerve injuries of upper limbs	0
Neuropraxia of nerves of lower limbs	14 (0.018)
Permanent nerve injuries of lower limbs	0
Deep vein thrombosis	22 (0.029)
Diathermy burn injuries	2 (0.002)
Entry related bladder injuries	6 (0.007)

The commonest complication was found to be shoulder pain {n=46 (0.060%)}, while the least common was diathermy injuries and entry related stomach injuries. {n=2 (0.002%)}.

There were no permanent nerve injuries in the upper and lower limbs.

DISCUSSION

Main findings

Overall, complications related to the areas assessed in the gynecological safety check list were low. Complications can occur due to the lack of safety measures, especially related to positioning and prolonged duration. Believe that these complications could be effectively prevented by the implementation of a safety checklist. This should be implemented during the pre-operative as well as at regular intervals during the intra-operative period. Authors believe short breaks in between prolonged surgeries are beneficial to both the patient and the surgeon, as the patient can be repositioned back to the supine position from the steep Trendelenburg position which helps reduce position related complications and also gives an opportunity for the surgeon to tackle physical and mental exhaustion. Nevertheless, implementation of such breaks would necessitate repeating the safety checklist while repositioning the patient again.

Interpretation

As mentioned above, the WHO safety checklist is a more general approach and neither specific to laparoscopic procedures nor gynecological procedures.[6,7] In addition, most of the safety check lists concentrate on surgical equipment and safety concerns that are specific to certain surgical steps.[9,10]

A similar study has been undertaken among robotic surgical procedures, which highlights the prolonged nature of these surgeries and specific key steps that need to be followed during robotic surgeries.[2] This study stands out from these as we pay more attention to position related injuries which can be easily prevented, and it is more specific to gynecological laparoscopic safety.

Strengths and limitations

This clinical audit has been carried out in one of the leading centres of excellence in gynecological laparoscopy in Sri Lanka, where a wide range of surgeries are being performed on a daily basis.

The most striking characteristic of this study is that all the surgeries were performed by a single consultant gynecologist which effectively nullifies inter-operator bias. According to currently existing evidence, there is no

established safety checklist for gynecological laparoscopy, and this would be the first of its kind.

However, the effectiveness of this safety checklist should be evaluated by completing this audit cycle keeping in mind the feasibility, patient and surgical team satisfaction and convenience

CONCLUSION

Although, the incidence of complications related to the areas assessed were low, it is our belief that these can be further reduced by implementing a safety check list specifically designed for gynecological laparoscopy.

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