

Total Laparoscopic versus Total Abdominal Hysterectomy: A Review of Surgical Approaches, Complications, Advantages, and Disadvantages

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Abstract

Background: Hysterectomy via laparoscopic surgery (total laparoscopic hysterectomy (TLH)) is now accepted as the gold standard for the procedure in suitable patients owing to its shorter recovery period and complication rates equal to those of an open procedure.

Aim: To review hysterectomy, total laparoscopic hysterectomy, and total abdominal hysterectomy, including their indications, complications, advantages, and disadvantages.

Conclusion: The advantage of TAH is that there is no limitation of the size of the uterus, allows wider exploration of abdominal-pelvic organs and it can be performed by less experienced surgeon. Laparoscopic hysterectomy benefits include less postoperative pain, a reduced hospital stay, an earlier return to professional activity, a short-term increase in quality of life and a better aesthetic outcome, when compared to abdominal hysterectomy.

Keywords: Hysterectomy; Total laparoscopic hysterectomy; Total abdominal hysterectomy; Complications; Surgical approach.

Introduction

Abdominal hysterectomy is the most widely performed technique worldwide and accounts for 66% of cases, while vaginal hysterectomy and laparoscopic hysterectomy account for 22% and 12% of cases respectively ⁽¹⁾.

Hysterectomy can be a difficult choice for women, with sexual and psychological changes that may lead to a non-negligible risk of post-traumatic stress ⁽²⁾.

The surgical approach to hysterectomy depends on the clinical indication and condition of the patient, the technical skills of the surgeon and patient preference. Vaginal hysterectomy, if it is technically feasible, is preferred over an abdominal approach because of more rapid postoperative recovery⁽³⁾.

The American Association of Gynecologic Laparoscopists suggests that many hysterectomies for benign conditions should be carried out using laparoscopy, since accumulating evidence confirms that laparoscopic hysterectomy is associated with less perioperative morbidity compared to abdominal hysterectomy (Buderath et al., 2023).

For many decades, abdominal and vaginal approaches were only used for the majority of hysterectomies, but the advent of laparoscopic technology resulted in the introduction of laparoscopic hysterectomy (LH), the minimally invasive approach. LH was performed for the first time in 1989 by Harry Reich. Approximately 30 years after its introduction, the use of laparoscopy is rapidly gaining ground and has been expanded from diagnosis and tubal sterilization to various complicated surgeries and is now even used for the management of malignancies ⁽²⁵⁾.

Types and Surgical Approaches of Hysterectomy

Types (Kives et al., 2010):

There are three types of hysterectomy based on which organs and tissue are removed:

Partial (supracervical) hysterectomy: The main body of the uterus is removed. The cervix, fallopian tubes and ovaries remain in place.

Total (complete) hysterectomy: The uterus and the cervix are removed. The fallopian tubes and ovaries remain in place.

Radical hysterectomy: A radical hysterectomy involves removing the uterus and cervix, the nearby part of the vagina and parts of the supporting tissues and sometimes also the fallopian tubes, ovaries and pelvic lymph nodes.

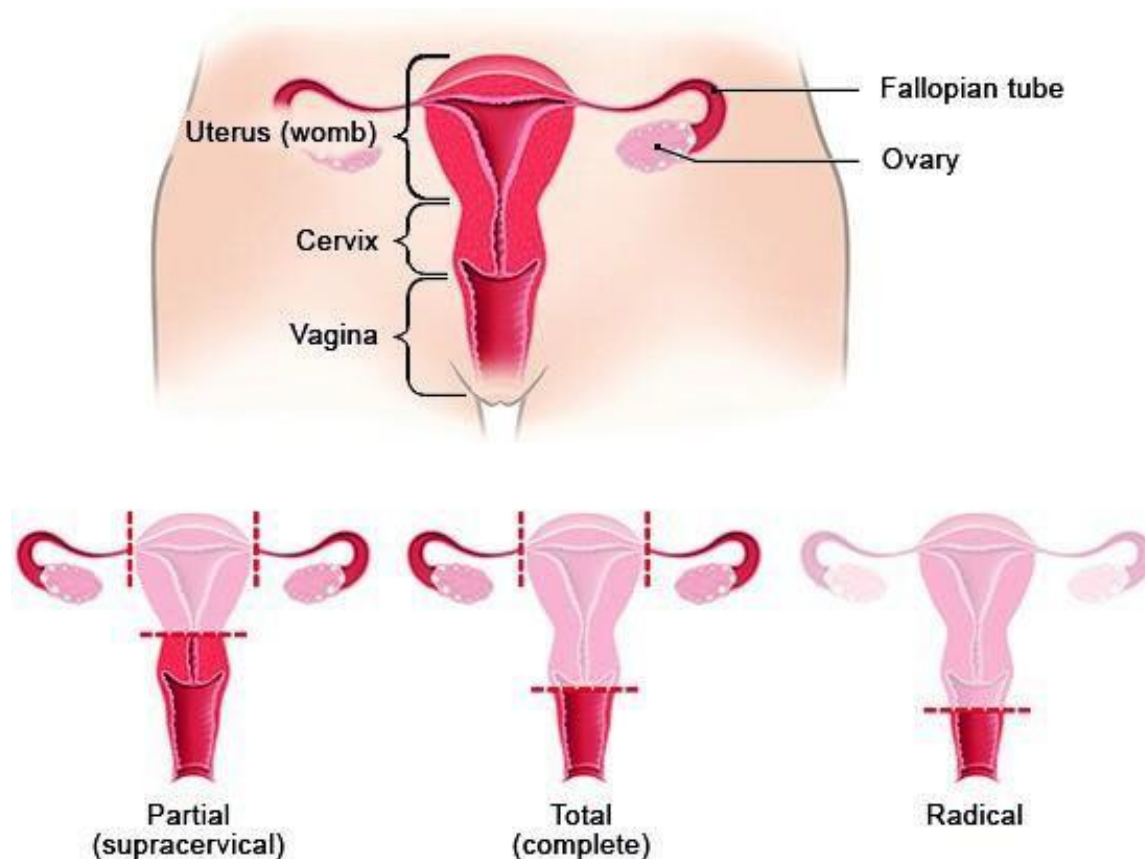


Figure 1. Types of hysterectomy (Kives et al., 2010).

Methods

The surgical approach to performing hysterectomy include: (abdominal, vaginal, traditional laparoscopic, robot-assisted laparoscopic, single-port laparoscopic/robotic surgery, and vaginal natural orifice transluminal endoscopic surgery (vNOTES)) ⁽³⁾.

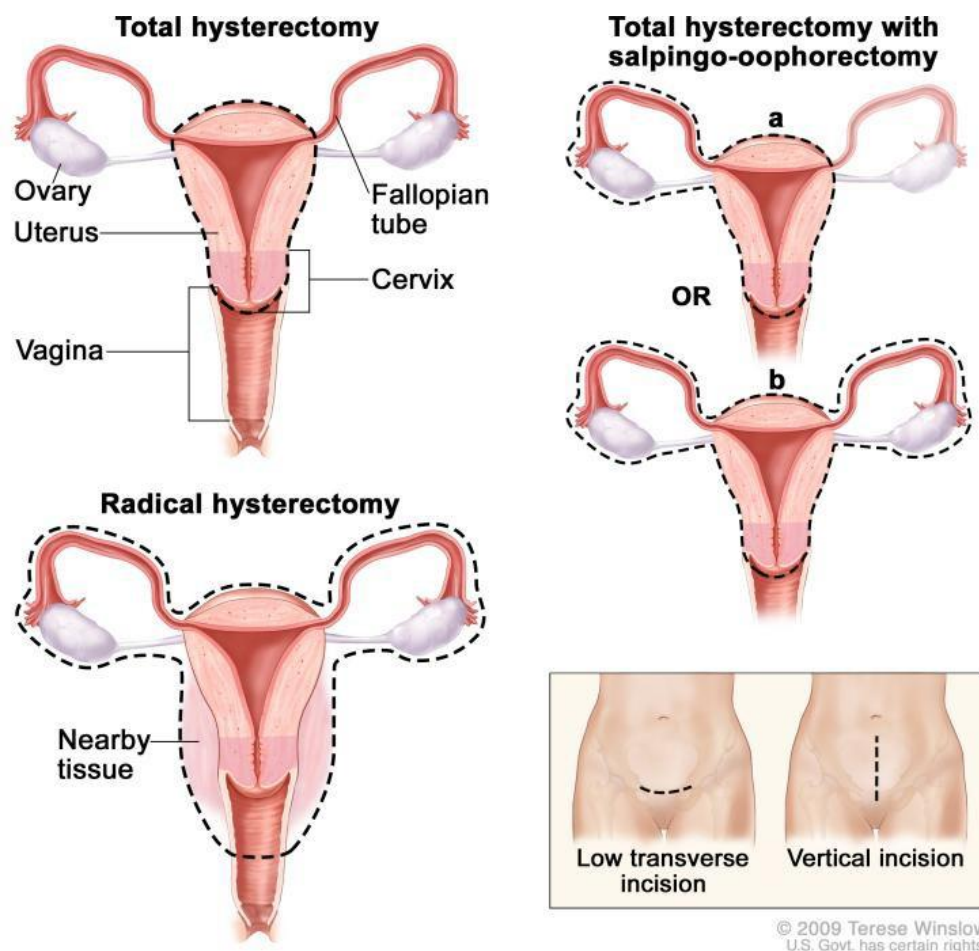


Figure 2. In a total hysterectomy, the uterus and cervix are removed. In a total hysterectomy with salpingo-oophorectomy, (a) the uterus plus one (unilateral) ovary and fallopian tube are removed; or (b) the uterus plus both (bilateral) ovaries and fallopian tubes are removed. In a radical hysterectomy, the uterus, cervix, both ovaries, both fallopian tubes, and nearby tissue are removed. These procedures are done using a low transverse incision or a vertical incision (Board, 2006).

Indications for Hysterectomy

There are several gynecological recommendations for hysterectomy, including malignant and benign conditions. The most frequent indications of hysterectomy are leiomyomas, abnormal bleeding, pelvic floor prolapse and cancers. (Hortu et al., 2020).

Nearly 90% of indications for hysterectomy are for benign conditions. The most frequent being uterine fibroids, representing 60% of all in-patient hysterectomies performed in 2012, followed by abnormal uterine bleeding and pelvic prolapse. Of the malignant indications, endometrial cancer ranked first. Over the past decades, there has been a proliferation of non-surgical treatments for benign gynecological diseases ⁽⁹⁾.

There are several indications for hysterectomy or the alternative procedures with preservation of the uterus which will be analyzed, some of these indications:

Fibroid Uterus:

Fibroids (myomas) originate from the uterine smooth muscle wall. The percentage of malignant transformation to sarcoma is 0,1–0,8% according to various references. Fibroids, depending on size and location can cause menorrhagia or symptoms from pressure to adjacent organs, for example, ureters, bladder, or intestine. Before proceeding to hysterectomy for a fibroid uterus, reproductive activity of the patient must be respected ⁽⁷⁾.

Endometrial Hyperplasia:

Endometrial hyperplasia with atypia associated with a high risk for malignant transformation, is an absolute indication for hysterectomy. In endometrial hyperplasia without atypia, hysterectomy is indicated only if pharmacological agents cannot control menorrhagia ⁽⁸⁾.

Adenomyosis:

A benign condition of the uterus which can cause menorrhagia characterized by diffuse spread of ectopic endometrium in the myometrium. Hysterectomy is indicated when other therapeutic approaches have failed to control symptoms (Habiba & Benagiano, 2021).

Uterine Prolapse:

It is not an absolute indication for hysterectomy. In case of absence of other uterine pathology (such as sarcoma, carcinoma of the endometrium, carcinoma of the cervix) the translocation of the uterus in its natural position and the surgical fixation of the uterus in the pelvis have better results than hysterectomy in the anatomy of the pelvic floor (Ding et al., 2023).

Dysfunctional Uterine Bleeding (DUB):

This common cause of abnormal uterine bleeding pattern is diagnosed when anatomical causes have been excluded. The problem is a hormonal imbalance in the hypothalamus-hypophysis-gonads axis ⁽¹⁰⁾.

Complications of Hysterectomy

Hysterectomy is a surgical procedure with potential surgical complications, with the highest rate within 30 days: (infectious consequences, hemorrhage, thromboembolic disease, urinary and/or intestinal tract injury, nerve injury and vaginal cuff dehiscence) ⁽¹¹⁾.

The complication rate is lower in patients treated with the minimally invasive technique ⁽¹²⁾.

Infection:

The risk of infection increases with operative times that exceed 3 hours, lack of preoperative antibiotics, and patient factors such as comorbid medical conditions, compromised immune status, obesity, and poor nutrition. Vaginal cuff cellulitis presents late in the hospital course or soon after discharge. Patients can be asymptomatic with spontaneous resolution of the inflammation or can present with fever, purulent vaginal discharge, pelvic pain, and exam findings of tenderness or induration at the vaginal cuff (Clarke-Pearson & Geller, 2013).

Venous Thromboembolism (VTE):

Patients undergoing major gynecological surgery have a significant risk of developing deep venous thrombosis (DVT) and pulmonary embolism (PE) when no thromboprophylaxis is given. The incidence of DVT after gynecologic surgery has been found in some studies to be higher in open procedures and in patients with malignant conditions. The exact incidence of VTE after hysterectomy is difficult to approximate, as many cases go unrecognized. The risks of thromboembolic events must be balanced against the potential risk of major perioperative bleeding (Sobh et al., 2022).

Genitourinary and Gastrointestinal Tract Injuries:

Injury to the genitourinary tract during pelvic surgery, while rare, can lead to a high risk of patient morbidity. Studies have indicated radical hysterectomy as the most common type of pelvic surgery associated with urologic complications. The bladder is injured more frequently than the ureters. A review of urinary tract injuries during benign gynecologic surgery found lower rates of bladder injury after abdominal hysterectomy than after laparoscopic and vaginal approaches ⁽¹³⁾

While injuries to the bladder and ureter may be noted during surgery, injury to the serosal layer of the bladder may go unnoticed during surgery if the defect in

the bladder wall is not full-thickness, and delayed presentation of vesicovaginal fistula can occur. GI tract injuries during an abdominal hysterectomy can occur via thermal injury, direct mechanical damage, and indirectly through interruption of vascular supply ⁽¹⁴⁾.

Bleeding

Abdominal hysterectomy is associated with more bleeding than the other routes of hysterectomy, with an average blood loss of 400mL. Studies have shown that estimated blood loss above this caliber is associated with increased risks of major postoperative complications and increased hospital stay ⁽¹⁵⁾

Vaginal Cuff Dehiscence

Cuff separation can occur within days of surgery or years later. The separation may be along the entire length or localized to a portion of the vaginal incision and can be of partial- or full-thickness. The most feared complication associated with vaginal cuff dehiscence is the evisceration of intraperitoneal contents through tissue separation. Total abdominal hysterectomy has been associated with a lower risk of vaginal cuff dehiscence compared to laparoscopic procedures ⁽¹⁶⁾.

Total Laparoscopic Hysterectomy

Hysterectomy via laparoscopic surgery (total laparoscopic hysterectomy (TLH)) is now accepted as the gold standard for the procedure in suitable patients owing to its shorter recovery period and complication rates equal to that of abdominal hysterectomy (Madhvani et al., 2019).

Laparoscopy has been performed in gynecological surgery for more than 20 years, and its use is increasing. In most countries, the proportion of LHs has gradually increased over the years ⁽¹⁷⁾.

Laparoscopic procedures have been used in minimally invasive gynecological surgery since the late 1980s. Nowadays, laparoscopic surgery has become the gold-standard approach for most benign and malignant gynecological diseases. Laparoscopy has many advantages compared to laparotomy, including a shorter operation time, better cosmetic effects, fewer adhesion formations, nearly no abdominal wall infections, fewer febrile episodes, less post-operative pain, and a shorter recovery (Interdonato et al., 2022).

Since the introduction of laparoscopic hysterectomy (LH) more than 2 decades ago, a rapid implementation of this procedure has been observed in many countries. For The Netherlands, the percentage of hysterectomies performed laparoscopically has increased from 3% in 2002 to 36% in 2012 and similar increases have been observed in other parts of the world ⁽¹⁸⁾.

Such rapid implementation can potentially result in unwarranted practice variations in health care delivery. Unexplained differences in health care delivery should be addressed as they are usually the consequence of a lack of consensus

and/or available evidence. Without a convenient standard of care, doctors are more prone to adopt medical practices that are based on personal experience. Furthermore, studies have shown that standardizing care on best practices is associated with better outcomes and reduced costs. As a result, it seems timely to define a standard of care for LH, according to the principles of evidence-based medicine (Ooi, 2020).

Complications of Total Laparoscopic Hysterectomy

inflammations and internal bleeding, bloodstream infections, urinary infections, respiratory infections, and fractious comorbidities), and pathogenic (cancerous and thromboembolism) ⁽¹⁹⁾.

Complications can be classified as:

Immediate as injury at entrance with the needle to a major vessel or bowel, surgical emphysema caused by air pressure, cardiac arrest

Perioperative (occurring less than a week after procedure) or delayed (1-6 weeks after surgery). High temperature, hemorrhage, bowel obstruction, blood clot, Pathogens that cause gastroenteritis, and postoperative hemorrhage are examples of short postoperative problems.

Delayed as seroma formation, spread of disease (endometriosis), adhesions, hernia at site of port insertion and intestinal evisceration through vaginal cuff because of dehiscence.

Several studies have addressed surgical related complications associated with minimally invasive total hysterectomy however, few investigations specifically analyzed the risk factors of surgical complications in patients undergoing total laparoscopic hysterectomy (TLH) ⁽²⁰⁾. Identification of patient-specific and procedure-specific factors for postoperative complications is essential to mitigate the likelihood of their occurrence. A recent data report a detailed description of intraoperative and postoperative complications occurred in patients who underwent TLH for benign disease ⁽²¹⁾.

Advantages and Disadvantages of Laparoscopic Hysterectomy

Advantages of laparoscopic hysterectomy: ⁽²²⁾; Small surgical wound; Short hospital stay; Rapid recovery; Invisible abdominal wound; Decrease in intraoperative bleeding.

The benefits of laparoscopic hysterectomy (LH) versus abdominal hysterectomy (AH) are a quicker return to normal activities, a lower intraoperative blood loss, a smaller drop in hemoglobin, a shorter hospitalization, and less infections. The drawbacks are more injuries to the urinary tract and longer operation time. However, the wider use of the laparoscopic approach and the improvement of surgeons' skills can decrease the incidence of complications. Laparoscopic hysterectomy was initially criticized due to its technical difficulty, higher operative time and apparent increase in major complications, namely as regards the urinary tract. ⁽²³⁾

Laparoscopic hysterectomy benefits include less postoperative pain, a reduced hospital stay, an earlier return to professional activity, a short-term increase in quality of life and a better aesthetic outcome, when compared to abdominal hysterectomy. From a technical point of view, laparoscopic approach benefits include high-definition imaging and vision amplification, allowing for an easier access to the uterine vessels, ureter, rectum and vagina ⁽²⁴⁾.

Despite the initial controversy regarding laparoscopic approach-related complication rate, most recent studies are consensual and present TLH as a safe and first-line technique in multiple surgical scenarios, either benign or malignant ⁽²⁵⁾.

Every laparoscopic surgery requires specific and expensive equipment and instruments. Preliminary studies have shown that laparoscopic hysterectomy was more expensive when compared to the abdominal approach. However, over the past few years, with more surgical experience and consequently lower complication rates, this financial reality has changed ⁽²⁶⁾.

Minimally-invasive approaches (vaginal and laparoscopic) are associated with a reduced hospital stay, less postoperative pain, transfusional need and infectious complication rates, as well as an earlier return to professional activity, all these factors contributing to an indirect cost reduction associated to the surgical procedure. In fact, the laparoscopic approach has been related to reduced costs, when compared to abdominal hysterectomy and apparent financial barriers to the implementation of laparoscopic hysterectomy should be overcome ⁽²⁷⁾

Total Abdominal Hysterectomy

Hysterectomy is one of the most frequent surgical treatments. It is the second most frequently performed major surgical surgery in developed nations after cesarean delivery. Patient education, compliance, and socioeconomic status are important determinants in choosing the mode of treatment choices. Medical treatment is usually inadequate and often disappears. Hysterectomy is an effective treatment for these patients; on the other hand, it provides such women with immediate and radical relief from their distressing problems (Dhobale et al., 2023).

An abdominal hysterectomy involves the removal of the uterus through an incision in the abdominal wall. As minimally invasive techniques have become more available, the rates of abdominal hysterectomy have declined since the less invasive approaches offer benefits such as less post-operative pain, expedited recovery times, and better short-term quality of life after surgery, as well as shorter hospitalization stays and reduced costs. Furthermore, the use of hysterectomy, in general, has decreased as alternatives to hysterectomy continue to gain

favor, such as endometrial ablation for symptomatic uterine bleeding and uterine artery embolization for uterine leiomyomas. Still, hysterectomy remains the most appropriate management option for many patients ⁽¹⁶⁾.

Large uterine size (>12 weeks gravid) has been cited as a common reason for choosing the abdominal approach to hysterectomy, as it has been thought that an enlarged uterus may require better visualization and exposure due to higher risks of blood loss, injury to neighboring viscera, and prolonged operating times.

However, there are no specific recommendations up to which uterine weight or size should qualify a patient for abdominal hysterectomy. Despite these findings, abdominal hysterectomy remains a common route of surgery being most commonly indicated for uterine fibroids, followed by abnormal uterine bleeding, prolapse, and endometriosis (Carugno & Fatehi, 2020).

Indications of Abdominal Hysterectomy

There are also obstetric indications for abdominal hysterectomy, in most cases in an emergency regime: severe postpartum hemorrhage (PPH)/atony refractory to pharmacological treatments, placenta accrete spectrum disorders (PAS), hypertensive disorders, disseminated intravascular coagulation (DIC). Nonetheless, peripartum hysterectomy is burdened with a higher morbidity and mortality rate (Meeks et al., 2022).

The most common indications for abdominal hysterectomy are the following:

Abnormal uterine bleeding

Malignancy and premalignant disease

Uterine leiomyoma

Endometriosis

Pelvic organ prolapse

Chronic pelvic pain

Pelvic infection

Abdominal hysterectomy is often performed in patients with enlarged, bulky uteri or past history of abdominal surgery and in the presence of extrauterine disease, severe adhesions or endometriosis, and gynecological malignancies in whom a minimally invasive route is considered technically challenging (Mustafa et al., 2020).

Uterine size larger than 12 weeks' gestation considered a reasonable qualification for an abdominal approach to hysterectomy; however, with the advances in surgical technology and the consistently proven superior outcomes of patients undergoing hysterectomy with minimally invasive approaches, less

invasive techniques are favored over the abdominal route when feasible ⁽²⁸⁾.

Complications of Abdominal Hysterectomy

The most common complications of abdominal hysterectomy categorized into infectious causes, venous thromboembolic disease, injury to the genitourinary and gastrointestinal tracts, bleeding, nerve injury, and vaginal cuff dehiscence. Additional potential complications after an abdominal hysterectomy include pelvic organ prolapse, pelvic organ fistula, urinary incontinence, and intestinal ileus. As with any surgery requiring general anesthesia, there is also the risk of adverse reactions to anesthetics. Abdominal hysterectomy has been determined to have higher odds of postoperative complications within 30 days of surgery and an overall higher risk of complications when compared to other minimally invasive techniques of hysterectomy such as laparoscopy ⁽²⁹⁾.

Advantages and Disadvantages of Total Abdominal Hysterectomy

The advantage of TAH is that there is no limitation of the size of the uterus, allows wider exploration of abdominal-pelvic organs and it can be performed by less experienced surgeon. It is especially helpful when anatomy is distorted by acute or chronic infections, dense adhesions, and endometriosis. Also, this route is at times

preferred in adnexal masses, diffuse endometriosis or chronic pelvic pain, which needs concurrent treatment at the time of hysterectomy. Disadvantages include longer duration of hospital stay, prolonged recovery and increased incidence of peritonitis, pulmonary and vascular complications. It is difficult to perform in obese patients. Also, laparotomy incision is associated with morbidity of pain, infection, dehiscence, evisceration, discomfort or hernia ⁽²⁴⁾.

Conclusion

The benefits of laparoscopic hysterectomy (LH) versus abdominal hysterectomy (AH) are a quicker return to normal activities, a lower intraoperative blood loss, a smaller drop in hemoglobin, a shorter hospitalization, and less infections. The drawbacks are more injuries to the urinary tract and longer operation time. However, the wider use of the laparoscopic approach and the improvement of surgeons' skills can decrease the incidence of complications. Laparoscopic hysterectomy was initially criticized due to its technical difficulty, higher operative time and apparent increase in major complications, namely as regards the urinary tract. ⁽²³⁾

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