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Alison J. White
University of Washington

Jason Herbeck
Boise State University

JoAnn Scurlock
Elmhurst College

John Mayberry
St. Luke's Wood River Medical Center

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Alison J. White, BA*

University of Washington School of Medicine
Spokane, WA
ajb46@uw.edu

Jason Herbeck, PhD

Boise State University
Boise, ID
jasonherbeck@boisestate.edu

JoAnn Scurlock, PhD

Elmhurst College, emerita
Elmhurst, IL
rbeal@uchicago.edu

John Mayberry, MD

St. Luke's Wood River Medical Center
Ketchum, Idaho
john.mayberry@idahosurgeons.net

Abstract

Background:

The Ancient Mesopotamian civilization, the earliest known, emerged in the fourth millennium BCE.¹ While the advent of medicine is established, there is little understanding of the surgery's origins. We sought to describe the characteristics and medical acumen of the surgeons of the first civilization.

Methods:

Source documents and commentary on Mesopotamian medicine were systematically analyzed for evidence of surgery and physician descriptions.

Results:

Early tablets reveal evidence of the incisional drainage of a scalp abscess and empyema, advanced wound care, fracture alignment, and possible caesarians without evidence of wound suturing, emergency procedures, trephination, or circumcision.² While the *asû* and *āšīpu* understood disease processes, strong evidence of an inextricable connection between spiritual and diagnostic/curative roles exists.

Conclusions:

Mesopotamian physicians were diagnosticians and healers, approaching surgery as part of their holistic practice rather than a separate entity. Surgery was utilized as an endpoint to a careful process aided by objective evaluation and spiritual incantation.

Keywords: history of surgery, Mesopotamia, ancient surgeons

Highlights:

- Surgery in Ancient Mesopotamia was performed by the physician, the *asû* or *āšīpu*
- Surgeons in Mesopotamia performed complex surgical procedures, including scalp abscess and empyema drainage, after careful diagnostic evaluation of the patient
- Surgery was part of a holistic approach to disease, integrated with spiritual/magical practices

Introduction

The Ancient Mesopotamian Civilization, the earliest known, emerged in the fourth millennium BCE with the first known therapeutic manual dating to 2112-2004 BCE.¹ From these records, two distinct healing roles emerge: the *asû* and the *āšipu*. These two professions have proven difficult to distinguish, with the *āšipu* traditionally being cast as the spiritual healer and the *asû* as the rational, medical healer.² A more nuanced understanding of these two roles has since supplanted this concept. As JoAnn Scurlock has argued, it is more likely that the *āšipu* was the primary diagnostician and the *asû* compounded drugs and treated a variety of ailments.³

The practice of medicine in ancient Mesopotamia, as employed by both *āšipu* and *asû*, has been well characterized. Just after the empire's fall, Herodotus described Babylonian medicine as primitive with patients being drug into the street for civilians to diagnose without physicians.⁴ These observations, however, must be understood in the context of upheaval at Babylon's fall and are from the perspective of an outsider who is unaware of the fluid role of the *āšipu* and *asû*. Since his 6th century BCE conclusions, historians and archaeologists have outlined a medical practice that was well established by the Old Babylonian and Old Assyrian periods (c. 2100-1500 BCE).^{5,6} Careful diagnostics, prognostics, and pharmaceutical interventions built on meticulous history taking and observation of the patient are well documented.^{1,7} Ancient Mesopotamian healers were capable of treating a wide variety of disease processes and employed an extensive list of complex pharmaceutical interventions to perform their healing role. However, while the advent of pharmaceutical medicine and its practitioners is well documented, there is little understanding of the origins of surgery. We sought to describe the characteristics, scope of practice, and medical acumen of the surgeons of the first civilization.

Methods

First, a search of relevant historical databases available for our use, including JSTOR(www.jstor.org), Project Muse (<https://muse.jhu.edu/>), and EBSCOhost Academic Search Complete (<https://web.p.ebscohost.com/ehost>), for peer-reviewed journal articles and contributions to volumes referencing surgery in the Ancient Near East was conducted using combinations of the following key words: "surgery," "Ancient Near East," "surgeon," "Assyria," "Babylon," "*āšipu*," and "*asû*." From an examination of these sources, source documents available in English and French translation were identified, located and systematically analyzed for evidence of surgical procedures as well as descriptions of physician characteristics and their understanding of pathophysiology. Expert commentary procured from a systemic search of databases, as well as print sources, was similarly analyzed for discussion of surgery and characterization of early practitioners of surgery.

Results

The earliest known, translated systematic record of medical practices in the ancient Mesopotamian world was compiled by Esagil-kin-apli, a scribe commissioned by the Babylonian king Adad-apla-iddina sometime during his reign from 1068 BCE – 1047 BCE.² In her *Sourcebook for Ancient Mesopotamian Medicine*, JoAnn Scurlock compiles translations of the medical tablets.

Several surgical interventions are included in the volume. Surgical drainage of a scalp abscess is detailed in the volume:

"If a man's scalp contains liquid, you repeatedly touch the place where it contains liquid with your thumb. If his ear stinks, [liquid] will come down [from his] skull. You open up and make an incision in his skull. You [dry up] the liquid of his skull. You wash [a thin cloth with water]"²

Fracture realignment was also practiced by the *āšipu* with the handbook instructing them create a salve "boil (it) in beer and bandage (him with it). Fourteen (plants): a bandage to make (limbs) go straight."²

The most complex surgical procedure within the tablets is the successful drainage of an empyema:

"If (a mild headache afflicts a person and) fever persists in his body and also he makes a loud growling noise, that person has a "cleft" [. . .] and sweat, [to cure him, you] (spill) over him and three ribs [. . .]. You make an opening in the fourth rib[with] a flint knife. Water and blood [. . .]

You boil five *qû* of *kasû* juice; you filter it. [. . .] You spill it over him and you clear it away. Once again you [. . .]. You heat it together and pour it in. [. . .] You make a lead drainage instrument. You thread it on a linen cloth and put it in. You boil the decoction in *kasû* juice. You make it into a dough. (If) you bandage him with it, {he should recover}”²

In these tablets there are clear and detailed references to wound care. If a patient was “stricken with a wound/sore and his blood vessels made liquid flow out (of it), you dry, crush (and) sift *kmakadu* (and) daub (it) onto the sore” but if “a sore produces cockspur... (you add) roasted *kasu*” and “ghee.”² There is also detailed post-operative care instructions following **drainage of a scalp abscess**:

“You [...] a *naliptu*-bandage (and) bandage (him) for two [days]. You take (it) off and you wash a thin cloth with water. You sprinkle (it) with oil (and) put (it) on the wound.”² These instructions go on to include the following ritual: “Recitation so that [the waters of the head] may not be detained (i.e., to ensure complete drainage of the abscess). Its ritual: You wrap a tuft of hair from the foot of a female [donkey] in [...] and put (it) on the places that have been smashed. You recite the recitation seven times.”²

The contents of the tablets are addressed to both *āšīpu*,”and “*asû* at various points throughout. These practitioners “were generally associated with temples and, in addition to their medical duties, performed purification rites in connection with calendric celebrations or the consecration of cult statues.”¹ It was within these temples that they received at least part of their education.⁵ A Babylonian Hymn to the Goddess Gula indicates that the healers used the texts as a guidebook in their practice:

“I am a physician, I can heal,
I carry around all (healing) herbs, I drive away disease,
I carry around texts which bring recovery,
I give cures to mankind.”⁸

References to surgery can also be found in legal texts. The Code of Hammurabi, dating from 1700 BCE, has the following payment for physicians:

“215: If a physician performed a major operation on a seignior with a bronze lancet and has saved the seignior’s life, or he has opened the eye socket [*nakkaptu*] of a seignior with a bronze lancet and has saved the seignior’s eye, he shall receive ten shekels of silver”⁹

Conversely, it demands the following penalty:

“218: If a physician performed a major operation on a seignior with a bronze lancet and has caused seignior’s death, or he has opened the eye socket [*nakkaptu*] of a seignior with a bronze lancet and has destroyed the seignior’s eye, they shall cut off his hand”⁹

In these passages, physician is referred to as *asû*.⁹

There is some evidence in letters to the king of Mari, a Mesopotamian city-state, that physicians regularly accompanied Mesopotamian military forces. The excerpt reads: “To my Lord say this: thus speaks Itur-Asdu, thy servant. There is no physician, no mason. The wall is crumbling, and there is no one to rebuild it. And if a sling-stone wounds a man, there is not a single physician. If it please my lord, may my lord send me a physician and a mason.”¹⁰ Here, the author of the letter appears to have used *asû*.

There is questionable evidence of Caesarian section.¹¹ Oppenheim notes the following medical finding discussed in a legal text:

“The child to be adopted, two years of age, is described in this document by the hitherto not attested Akkadian expression *šilip rēmim* which means “pulled out (lit. : who was pulled out) from the womb”¹¹

Oppenheim speculates that this either means that he was delivered by means of the obstetrical forceps or that it was cut out of the womb of his dead or dying mother in an emergency operation.”¹¹ There are notably few references to obstetrics care and as Robert Biggs notes, “there are no indications in the medical texts that physicians assisted the delivery of babies. Rather, the assistance was provided by a midwife (*šabsūtu*), probably aided by a female relative.”¹²

We found no evidence of surgical interventions, e.g. episiotomy, by midwives. However, there is evidence that a *kakku*, a surgical tool, was used to extract attempt extraction of a fetus that died in the womb.¹³ *Kakku* is translated elsewhere as a weapon.¹⁴

There is suggestion, also by Biggs, that there were female physicians and this is further suggested by scholar Jean Bottero.¹⁵ The details of this or any primary sources referring to the female physician are unclear based on our search, although, as Biggs suggests, midwives were likely female relatives.

Discussion

The first surgeons in the ancient Mesopotamian civilization were not distinct from the well characterized *asû* and the *āšīpu*. Although surgical tools do not appear in the largest body of medical texts, at some point in the development of Mesopotamian medicine, the *asû* picked up the scalpel. The Code of Hammurabi indicates that surgery was performed by the *asû* with enough regularity and success to warrant standardized payment. There is also no discussion of a distinct role of a surgeon apart from the *asû* and the *āšīpu*, who share a very fluid role with each other. As discussed, Dr. JoAnn Scurlock argues that the *asû*'s profession "clearly overlapped fairly dramatically with that of the *āšīpu*, but in a way that made them compatible rather than conflicting specialists."² She goes on to argue the *āšū* compounded drugs and knew how to perform various interventions, leaving the diagnosis of "complex illnesses" to the *āšīpu*.³ Robert Biggs goes on to suggest that the two roles may have been even more fluid:

"An especially interesting example can be cited of the apparently fluid boundaries between the practice of the *āšīpu* and that of the *asû*. In a document datable to 681, Urad-Gula is listed as a deputy of the chief physician. In 671 he is listed as an *āšīpu*. Several years later he was dismissed, but then in 650 he is listed as an *asû*. This example comes from the Assyrian royal court, and we do not know whether it was a very special case"¹²

Although it has been suggested by Biggs and other scholars that surgery was learned entirely "on the job," the inclusion of detailed and specific surgical interventions as well as meticulous instructions for wound care indicate that surgery was undertaken by the same professionals whom the medical texts address. The *āšīpu*, who functioned as the early surgeon, was a skilled diagnostician who took detailed histories and utilized temple-based training in conjunction with extensive instructional tablets to treat patients. At the same time, they were based in temples of the healing goddess Gula and worked closely with diviners and other members of the temple.¹ This connection between the spiritual/magical practice of ancient medicine and the observationally driven interventions is clearly indicated in the available medical texts when detailed recipes for salves are accompanied by incantations or other procedures to suggest an element of mysticism (e.g. the hair of a female donkey being placed upon a wound with a recitation following the draining of a scalp abscess). The technical aspects of Mesopotamian medicine, including complicated recipes for pharmaceutical interventions and instructions for surgical intervention, are embedded within instructions for spiritual/religious elements. Furthermore, the apparent interconnectivity between the *āšīpu* and *asû* reinforces the link between the "spiritual" and "rational" world in the practice of ancient surgery.

As well as being skilled diagnosticians, the *āšīpu* and *asû* were capable of advanced surgical technique. Perhaps most interesting to a modern medical audience is the precision of empyema drainage. Discussion of this procedure exists in Rene Labat's 1954 paper in which he notes that this procedure is very similar to a modern thoracentesis for the same ailment under the assumption that the conventional rib numbering may have been inverted in the ancient world.¹⁶ He argues that this assumption allows for the Mesopotamian's third and fourth intercostal space to correspond with the 8th and 9th in the modern world, rendering the ancient procedure very similar to current recommendations.¹⁶ Their attention to cleaning the wound and applying empirically beneficial salves also indicates that they addressed infection control at some level.

Since the *āšīpu* and *asû* themselves assumed the role of surgeon in Mesopotamian medical practice, it is likely that the practitioner of surgery also served as a skilled diagnostician, using a combination of careful history gathering and observation to successfully treat his patient. Indeed, both detailed accounts of surgical incision (the drainage of the scalp abscess and the surgical treatment of an empyema) are preceded by key diagnostic elements. An abscess is only to be drained after an assessment of the lesion.² Draining an empyema also comes with a specific inclusion criteria of fever and labored breathing.² The careful inclusion of diagnostic criteria prior to a surgery as well as the prognostic element at the end of the instructions indicates that surgical intervention was performed only as an endpoint to careful

observation and diagnosis of a condition that could not be treated pharmaceutically or otherwise. In his discussion of caesarean section, Oppenheim notes that caesarian's in the ancient world were typically performed only after the mother had died, indicating that the procedure was only performed when the patient could not recover.¹² Thus, surgery was not commonplace and occurred only when the patient's condition would not be significantly endangered by the procedure.

The limited record of surgical interventions further supports the careful consideration with which surgery was initiated. Rene Labat suggests that "It must have been by way of clinical experience that the young doctor was initiated into the operative secrets of his 'boss.'"¹⁶ Similarly, P.B. Adamson suggests that surgery did occur and comments on the absence of texts: "Although it is possible that surgical texts may be found in the future, it is rather unlikely. Their absence cannot be taken as proof that the ancient Mesopotamians did not practice surgery; it is probable that surgical techniques were handed down orally and demonstrated by actual example."¹⁷ Notably absent from the medical texts is discussion of battlefield surgery or wound care. As Richard Gabriel suggests, the physicians would have likely accompanied the Mesopotamian military, tending to wounds and caring for victims.¹⁰ Surgery was likely reserved for extreme cases, rendering a written record unnecessary for its practitioners.

Although the references to surgery in existing, translated texts fall well short to records of pharmaceutical interventions in number and depth, the references we do have indicate a high level of surgical and diagnostic skill in the Ancient Near East. Without the advantage of autopsy or specialization, like Egyptian or Greek physicians in the Ancient World, the surgeons of Mesopotamia were able to use careful observation, centralized training, and recorded medical knowledge to perform complicated procedures that benefitted their patients.⁷ Despite the integral role of the *āšipu* and *asû* to the spiritual and religious aspects of their community, record of their surgical capabilities paint a picture of a practice that was equally based on empirical evidence and rational interventions.

Figures

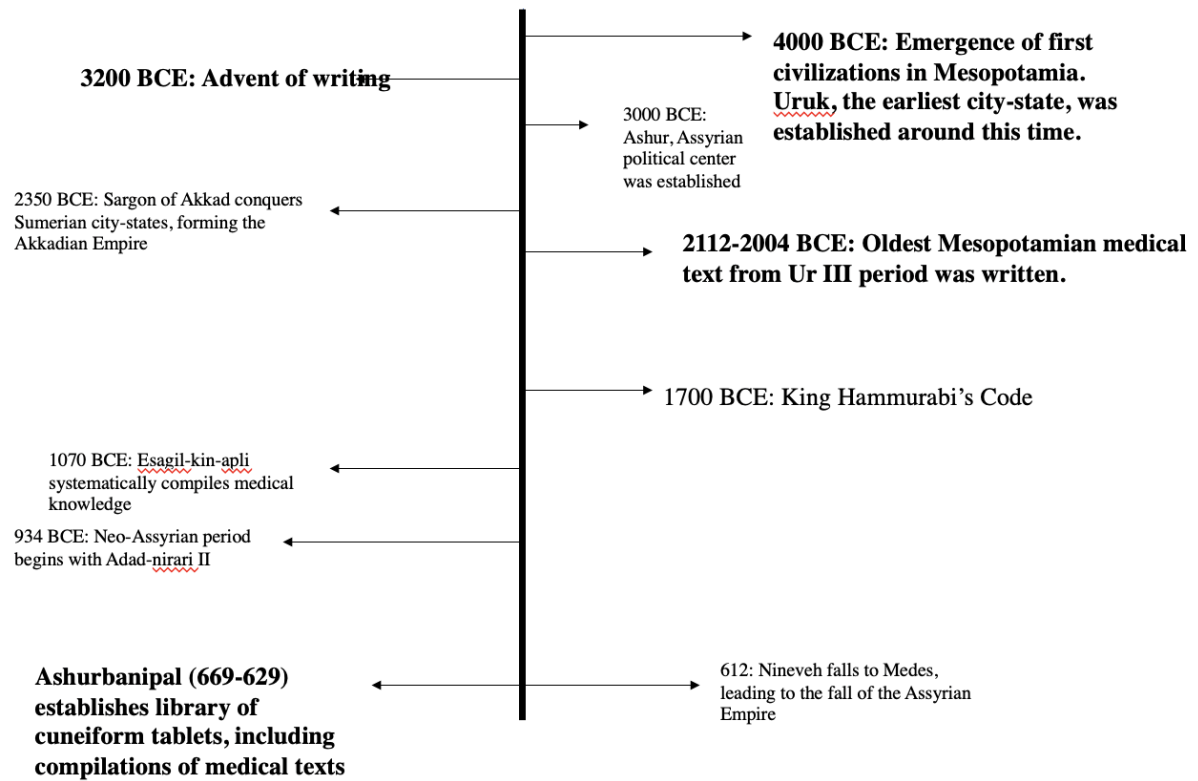


Figure 1. An abbreviated timeline of key developments in Mesopotamian civilization with an emphasis on major cities and medical records. The timeline is based on a combination of Ascalone's *Mesopotamia*, Scurlock and Anderson's *Diagnoses in Assyrian and Babylonian Medicine*, Majno's *The Healing Hand*, and Ali and Ali-Hijaji's "Surgery: Pearls in Ancient Mesopotamia."^{1,7,10,18,19} Although medical texts appear later in the timeline, they are reflective of practices which evolved since the earliest civilizations.

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