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Journal of Archaeological Science

journal homepage: <http://www.elsevier.com/locate/jas>

## A pregnant ancient egyptian mummy from the 1st century BC

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### ARTICLE INFO

#### Keywords:

Egyptian mummy  
Radiology  
Physical anthropology  
Egyptian religion  
Archaeology of childhood  
Non-invasive archaeology  
Bioarchaeology

### ABSTRACT

Radiological examination of an ancient mummy said to have been found in royal tombs in Thebes, Upper Egypt, has proved it is the body of a pregnant woman. She came from the elite of Theban community and was carefully mummified, wrapped in fabrics, and equipped with a rich set of amulets. Closer examination has revealed that the woman died between 20 and 30 years of age together with the fetus in age between the 26th and 30th week of the pregnancy. This find is the only known case of an embalmed pregnant individual.

This mummy provides new possibilities for pregnancy studies in ancient times, which can be compared with and related to current cases. Furthermore, this specimen sheds a light on an unresearched aspect of ancient Egyptian burial customs and interpretations of pregnancy in the context of ancient Egyptian religion.

### 1. The main text

The development of research techniques of ancient mummies (see e.g. Price et al., 2016) makes them a priceless sources that allow examination of well-preserved bodies from diverse perspectives and extracting various information. A recent radiological research of ancient Egyptian embalmed body preserved at the National Museum in Warsaw brought to light substantial research material for various specialists and has a potential to provide new data on a poorly known subject of pregnancy in ancient times (see e.g. Cooper and Phelan 2017).

The collection of ancient Egyptian mummies preserved at the National Museum in Warsaw has never been studied in detail before, with the exception of some selected objects (see e.g. Urbanik et al., 2001). The Warsaw Mummy Project was implemented in 2015 with the aim of conducting a comprehensive analysis of all human and animal mummies at the museum. One of the specimens has been completely reinterpreted thanks to the current research and is the subject of this paper.

### 2. Provenance and history of the mummy

The mummy, its coffin, and cartonnage case (a decorated cover of the mummy) (Figs. 1 and 2) are the property of the University of Warsaw, deposited in the National Museum in Warsaw under the number 236805/3 since 1917/18. The object measures 162 x 42 × 28 cm. It was

acquired by Jan Wężyk–Rudzki (1792–1874) in Egypt and donated to the University of Warsaw in December 1826 (Jaworski 2001: 49; Dolińska 2003: 445). The findspot of the mummy is uncertain as is the itinerary of Wężyk–Rudzki's travel. According to Wężyk–Rudzki's letter published in newspapers *Monitor Warszawski* [Warsaw's Monitor] and *Gazeta Warszawska* [Warsaw's Newspaper] (14th and 16th of December 1826, respectively) the mummy came from the "royal tombs in Thebes" (see also Dolińska 2003: 445–7), but according to Hipolit Skimbrowicz's inventory of the Museum of Antiquities of the University of Warsaw made c. 1869 (Jaworski 2001: 49 and 51) and Władysław Noskowski's obituary dedicated to Wężyk–Rudzki, the mummy came from the Pyramid of Cheops in Giza (Noskowski 1874; Dolińska 2003: 446).

Skimbrowicz's inventory was written many years after the mummy was donated to the University (Jaworski 2001: 49) and there are some errors in Noskowski's obituary (Dolińska 2003: 446). Therefore, Wężyk–Rudzki's letter seem to be the most reliable first-hand source. However, in many cases antiquities were misleadingly ascribed to famous places in order to increase their value (Dolińska 2003: 451), and there are grounds to think that the mummy was not found in a royal tomb (see below). Thus one cannot solely rely on Wężyk–Rudzki's statement.

The reading of the inscription on the coffin supports Wężyk–Rudzki's information published in the newspapers that the set came from Thebes

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<https://doi.org/10.1016/j.jas.2021.105371>

Received 28 December 2020; Received in revised form 1 March 2021; Accepted 8 March 2021

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(see below). Nevertheless, its sourcing from the royal tombs should be treated with great caution, since during Węzyk-Rudzki's travel the historical topography of Thebes was poorly recognised and the only royal tombs in the region known at the time were located in the Valley of the Kings (see e.g. [Jacotin, 1826](#); pl. 5). But no Greco-Roman Period (332 BC – 395 AD) burials were reported from the site so far ([Cannata 2020](#): 347; all dates in the paper after: [Hornung et al. 2006](#)). Therefore, the coffin and cartonnage may have been found elsewhere within the vast Theban necropolis.

Probably due to the colourful and rich ornaments covering the coffin and cartonnage the specimen was dubbed the 'mummy of a lady' in the 19th century. The name written in hieroglyphs on the coffin and cartonnage was translated in the 1920s and 1960s as Hor-Djehuty ([Henzel 1929](#); [Pomorska 1963](#); [Marciniak 1964](#)). According to the inscription on

the assemblage he was a 'scribe, priest of Horus-Thoth worshiped as a visiting deity in the Mount of Djeme, royal governor of the town of Petmiten, Hor-Djehuty, justified by voice, son of Padiamonemipet and lady of a house Tanetmin'. Another inscription in the set also mentions that he was a singer to the god Montu. This information allows us to establish the provenance of the set.

Djeme is a temple complex and a town in the modern village of Medinet Habu in present-day Luxor area (ancient Thebes), southern Egypt, and the Mount of Djeme is one of the cult places within the town walls ([Fazzini 1988](#): 24). Petmiten was a town in the same district as Djeme ([Marciniak 1964](#): 100). The god Montu was worshiped in several places in the region, the most noticeable place being Hermontis (modern Armant, c. 15 km south of Medinet Habu). Djeme was the capital of the administrative district ([Marciniak 1964](#): 100–1; [Vandorpe 1995](#):

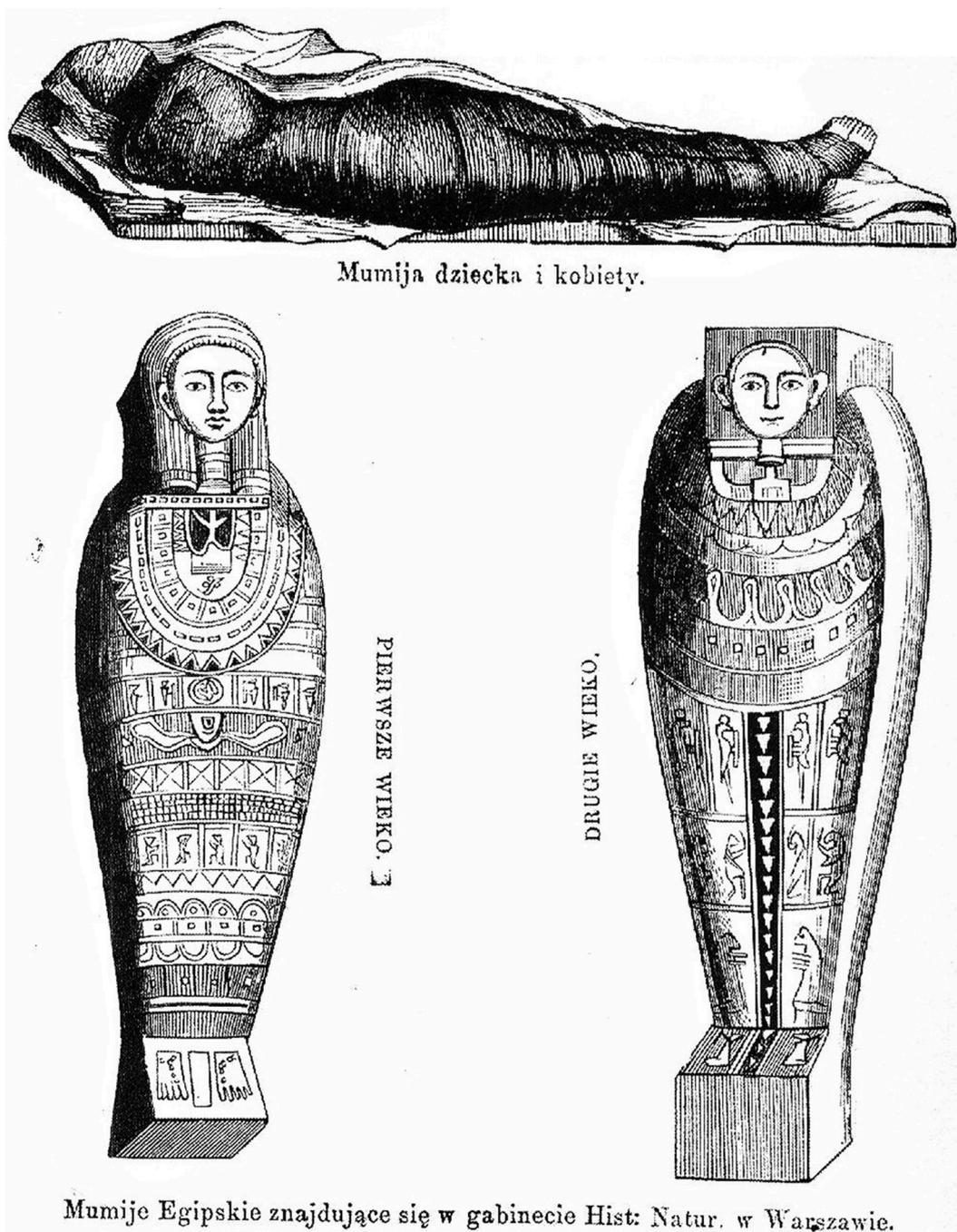


Fig. 1. Earliest depiction of the set published in the magazine *Przyjaciel dziecka* in 1862 (II p. 379).

203–240). The composite deity Djehuty-Hor or Thoth-Horus<sup>2</sup> was worshiped in a small temple erected by the King Ptolemy VIII (reigned 169–116 BC) neighbouring Medinet Habu from the south, whose modern name is Qasr el-Aguz (Volokhine 2002). The cult image of Thoth-Horus most probably visited the temples in Djeme during rituals and festivals, thus the expression ‘Horus-Thoth worshiped as a visiting deity (*hr-ib*) in the mount of Djeme’ on the coffin. The priestly function of the original owner of the set most probably prompted his name, which was the same as the one of the god to whom he was devoted. The craftsmanship and style of the coffin, as well as the cartonnage, allow us to date the objects to the 1st century BC/1st century AD (Pomorska 1963; Marciniak 1964; Dolińska 2003: 457), however the position of the temple scribes (notaries issuing secular documents in temples) had disappeared by the end of the 1st century BC or at the beginning of the 1st century AD (for the historic background and clergy in Thebes see: Vandompe 1995: 203–240). Hence, the 1st century BC is the most plausible time of the execution of the coffin and cartonnage. The quality of the set and titles of the owner indicate that Hor-Djehuty was a high-ranking official active in the northern part of Memnonia, i.e. the administrative district on the west bank of the Nile in Thebes, during late Ptolemaic times.

Within the vast cemetery of Thebes are several places where Greco-Roman graves have been attested and where he could have been buried. The mortuary temple of Amenhotep son of Hapu neighbouring Djeme was used for interments in Ptolemaic times (Cannata 2020: 347) and is a likely candidate for the interment of Hor-Djehuty since it is located by

the temple and the town where he was working. However, the radiological examination of the mummy demonstrated that the coffin and cartonnage were made for a different person than the mummy that was donated by Wężyk-Rudzki within the set.

The interpretation of the mummy’s sex as a male was established by radiological examinations in the 1990s (Urbanik et al., 2001). But, the current research proves that the sex of the mummy is undoubtedly female (see below). Thus, the location of the original findspot of the body is unknown. One can only speculate that the mummy was placed in a wrong coffin by accident in ancient times, or was put into a random coffin by antiquity dealers in the 19th century (see below). Since the dating of the mummy, coffin, and cartonnage match (see below), there is a chance that they came from the same cemetery.

### 3. Non-invasive investigation

The mummy received several sets of X-ray cross-sections while being scanned by Philips CT Big Bore equipment in December 2015 at the Affidea Clinic in Otwock (Poland). Each set of the mummy’s tomographic slices started at a different point, which allowed them to be combined into a single high-resolution model. Moreover, pantomographic images (curved surfaces tomography) of its mandible and maxilla were obtained by using the same equipment, providing much more data than performing the plain surface CT. The data obtained were processed via the OsiriX DICOM Viewer for macOS platform. As a result, high-quality 3D models and cross-sections of the body were made

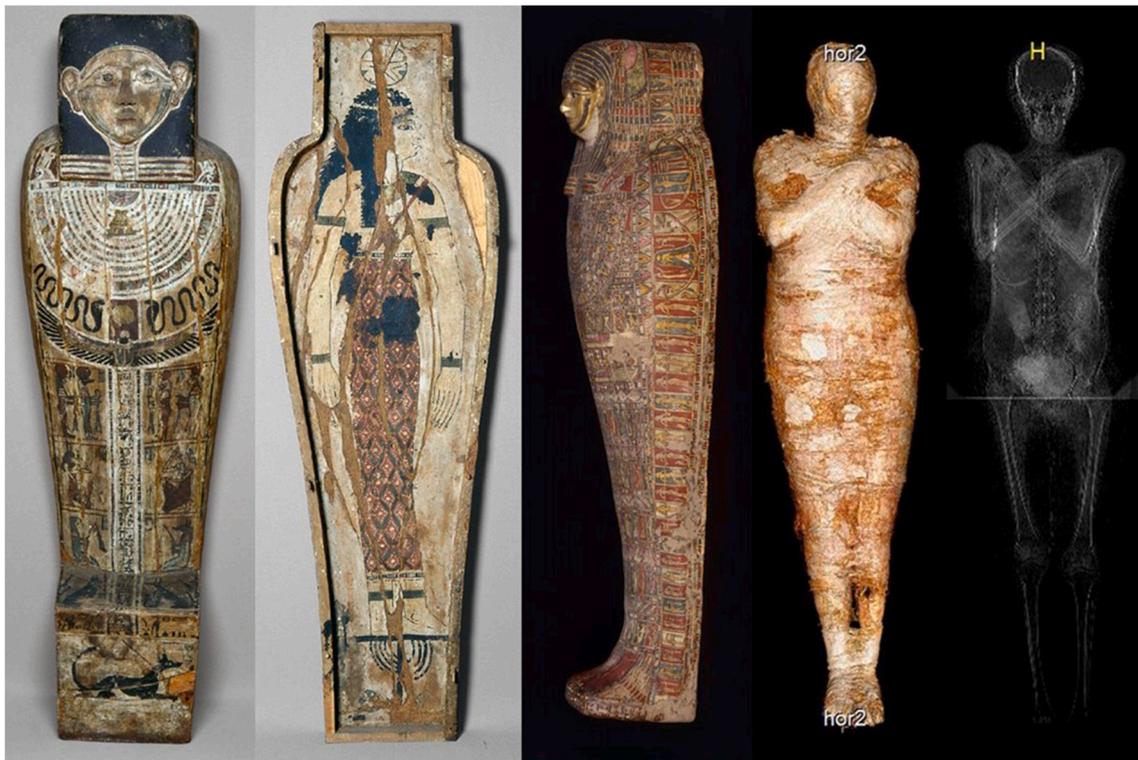


Fig. 2. The set 236805/3 consisting of the coffin, cartonnage case, and the mummy acquired by Jan Wężyk-Rudzki (images © Muzeum Narodowe w Warszawie, CT and X-ray by the Warsaw Mummy Project).

<sup>2</sup> The order of the names can be reversed and two different readings of the name can be made by scholars to distinguish the god from the person, i.e. ancient Egyptian and their Greek interpretation: Djehuty = Thoth, i.e. Horus, thus Hor-Djehuty is a name of the person and Horus-Thoth the god, although for ancient Egyptians there was only one reading, i.e. Hor-Djehuty.

(Fig. 3). The X-ray of the specimen was also made using a portable unit Optima XR220amx by General Electrics.

As a result of the non-invasive examination new information regarding the content of the bundle was obtained. The forearms are crossed over the chest. The right pubis bone was broken *post mortem* while other bones of the pelvis are slightly shifted from their original positions. Overall, the body is very well preserved. The soft tissues were



Fig. 3. The head and CT scans the mummy 236805/3 (Warsaw Mummy Project/Aleksander Leydo and Łukasz Kownacki).

dried, including the internal organs (for example the tongue). Fractures of the ethmoid bone show that the brain was removed through the nasal cavity. The cranial cavity was filled with an embalming substance. The eyes, nose, and mouth were not filled with any substance or material. The cross-sections revealed that the arms, legs, and torso were wrapped separately in at least 10 layers of bandages. Empty spaces between the legs, arms and chest, as well as other hollow spaces were filled with textiles. The whole body was then once again wrapped in further layers of bandages. The bandages on the top of the chest were modelled in the shape of the woman's breasts, with small round disc-like objects, probably made of metal, imitating nipples placed between the layers of the bandages, just above the real nipples. These textiles were partly covered by bitumen (or a bitumen-like substance). The whole bundle is covered by a partly preserved shroud which was fixed to the body by string ties. The wrappings on the neck were partly damaged, probably by robbers, because it may have featured amulets which were stolen. This suggests that the robbing was done by people who knew where to look for precious objects, probably 19th century antiquities dealers. Further evidence of robbing are seen in the form of torn strings in the region of the neck and upper part of the chest, as well as dislocated small objects from a necklace, probably beads, among the bandages around the neck. The external layers of the wrapping are also missing in some places, resulting in some of the tips of the fingers and toes being exposed.

The fabric of the wrappings was made of flax fibre (linen), warp-faced plain weave (plain weave 1:1, warp, S-spun, ca. 48 threads per cm, weft, S-spun, c. 16 threads per cm), which was typical for Egyptian mummy wrappings in all periods (Salmon 1988).

A vertical cut through the skin of the lower left abdomen was observed. This is related to the removal of the viscera during the mummification process (Ikram and Dodson 1998: 103–31; Carruthers 2017). Four bundles were detected inside the mummy's abdominal cavity, which probably contains the four internal organs, most probably the lungs, liver, stomach with intestines, and heart, as it was customary to extract, embalm and return these viscera into the body during the mummification process (Ikram and Dodson 1998: 103–31; Carruthers 2017). Although the mummy was robbed, several objects are still preserved among the bandages (Fig. 4). Three artefacts were noticed in the area of the head and the neck (10–12 in Fig. 4). It is difficult to establish their nature and interpretation. Further down, the aforementioned two discs are covering the nipples (6 in Fig. 4). Some objects were found under the right shoulder and chest, on the back side of the mummy and between her legs (7–9, 14, 15 in Fig. 4). Four amulets, measuring c. 4 cm each, were discovered on the chest of the mummy and are mummyiform (1–4 in Figs. 4 and 5). Their location and form suggest that these are the so-called "Four Sons of Horus", which are mummy-shaped amulets

depicted with animal or human heads. These divinities are: Qebehsenuef (with a hawk head), Hapy (baboon headed), Duamutef (with a jackal head), and Imsety (human-headed), which were protecting viscera (Andrews 1994: 45–6). In total, at least 15 objects may have been included among the wrappings of the mummy (Fig. 4).

There is an object in the lower part of the abdomen, upon the navel, which is a very rare find (5 in Figs. 4 and 6). The artefact is in the shape of a conical-disc and surrounded by a ring made of textile. Textile rings over the navel are attested in Ptolemaic dated mummies, ÅS 73b in Munich and Aset-iri-khet-es in Krakow (MAK/AS/2438), both of which are dated to the 1st century BC (Niwinski 1998: 184; Niwinski, 2001: 52 respectively).

#### 4. Dating of the mummy

It is clear that the female mummy does not match the coffin and cartonnage case made for a male, in which it arrived in Warsaw. Illegal excavations, looting of mummies, partial unwrapping in search of valuable objects, then rewrapping, 'beautification', and placing back into coffins (not necessarily the same ones in which the mummy had been found) were common practices in the 19th century (see e.g.: Pettigrew 1834: 227–230; Tyszkiewicz 1994: 247–249; Dolińska 1997). It is estimated that even up to 10% of mummies may not match the coffins they were contained in originally when they reached museum collections (Cockburn et al., 1975: 1158). Moreover, it was a common practice in ancient Egypt that coffins were reused, sometimes within a single family (Cooney 2011). Consequently, the mummy 236805/3 at the National Museum in Warsaw cannot be dated by the style of the package.

Therefore, one needs to analyse the bundle itself. Carbon dating of the wrappings may not provide reliable results due to the bitumen and resins used during the embalming process, which obstruct the carbon dating outcomes (Clark et al., 2016; Quiles et al., 2014). Thus, the mummification technique was examined, especially in the context of Theban embalming traditions, since this area is the most likely place of its origin.

There are several clues suggesting dating of the object. A cut in the left side of the abdomen of the mummy was made to remove and put back the viscera. The practice of returning the mummified heart, lungs, liver, stomach and intestines into the body is attested in non-royal mummies starting from the times of the 21st Dynasty (c. 1069 BC – 945 BC). In the case of royal bodies this practice started earlier (Ikram and Dodson 1998: 103–31; Carruthers 2017). This procedure was less popular in the Greco-Roman Period (c. 323 BC – c. 380 AD), which also witnessed a decline in the quality of embalming. Evisceration through

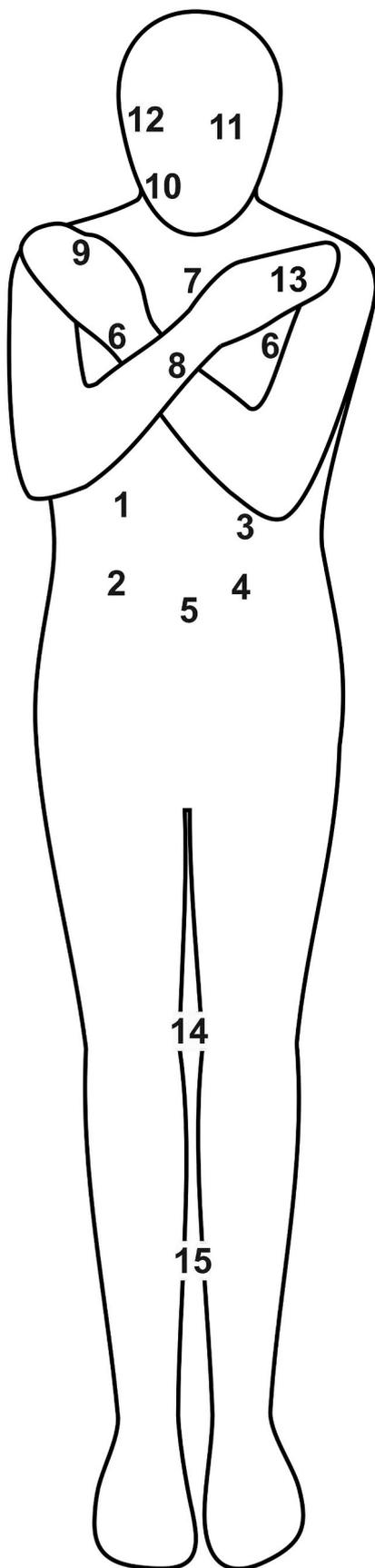


Fig. 4. Location of artefacts inside the mummy 236805/3 (S. Szilke).

the rectum became widespread from the Late Period (c. 664–332 BC) and continued through Greco-Roman times, however there was no consistency and many exceptions are attested (Ikram and Dodson 1998: 103–31; Carruthers 2017). The four amulets representing the Four Sons of Horus were placed in mummies since the 21st Dynasty to protect returned viscera (Andrews 1994: 45–6; Ikram and Dodson 1998: 103–31; Carruthers 2017). Numerous amulets among the layers of the wrappings are typical for the Late Period and Greco-Roman times in Egypt, though royal mummies were richly equipped with objects during all periods (Ikram and Dodson 1998: 103–31; Carruthers 2017). The substance covering the wrappings of the mummy, which is or resembles bitumen, was used from the New Kingdom (c. 1550–1069 BC) and became especially popular in the Greco-Roman period (Clark et al., 2016). The tradition of crossing arms on the chest ended in Thebes mostly during the Ptolemaic era (Gessler-Löhr 2012). Gilding skin with gold is frequently attested in well-made mummies of Roman times (Gessler-Löhr 2012: 675). The crossed forearms and lack of gilding in the case of the Warsaw mummy indicate a pre-Roman embalming of the specimen, i.e. before c. 31 BC. The textile ring and object over the navel have analogies only in the Ptolemaic times (323–30 BC), especially the 1st century BC (Niwiński 1998; Niwiński, 2001: 52), which is an indicator of the time of wrapping. However, one cannot exclude rewrapping of the mummy even a long time after the original embalming. There are known examples of rewrapped mummies, e.g. The Manchester Museum mummy no. 1770 (Tapp 1986, 51–56).

Deceased members of the elite were treated with both traditional and innovative mummification techniques in Greco-Roman Period Thebes (Gessler-Löhr 2012), which make dating of their embalmed bodies difficult. The number and character of the artefacts with which the mummy was buried indicate rather Ptolemaic times, but the quality of the mummification is as fine as the specimens of the 21st Dynasty. Such well-made mummies did not occur often after the 21st Dynasty (Gessler-Löhr 2012). Thus a wide, but reliable time-span of the execution of the mummy may be proposed: from the 11th to the 1st century BC. However, the artefacts above the navel and other features indicate Ptolemaic times, presumably the 1st century BC.

In conclusion, the body belonged to a high status woman and the mummy was most probably made during the 1st century BC.

## 5. Sex and age

The sex of the individual as female was confirmed by the presence of the fetus, breasts, and female genitalia visible on the CT images. The teeth of the individual are well preserved and slightly worn (Fig. 7). The tips of the roots of the 3rd molars were completely formed. The squamosal suture is not obliterated. These indicate that the woman died at an age between 20 and 30 years (tooth wear according to: Lovejoy 1985; Christensen et al., 2019; skull sutures obliteration according to: Mendil and Lovejoy 1985; Piontek 1999: 150–152).

## 6. Fetus

The fetus is located in the lower part of the lesser pelvis (minor) and partly in the lower part of the greater pelvis (major) (Fig. 8). It was mummified together with its mother. However, it was not removed from its original location. It was left intact in the uterus. Its head circumference is 25 cm, thus allowing us to estimate its age as the 26th – 30th week of foetal life (Hadlock et al., 1982; Campbell 1977).

Due to the poor state of preservation of the child's skeleton (i.e. shrinking of the bones caused by drying, fractures, low consistency) it was impossible to take any measurements of other bones.

The fetus is surrounded by the tissue of the uterus, which is obstructing the extraction of the CT image of the child and its detailed analysis. The fetus was not taken out from the uterus, as was in the case of the heart, lungs, liver, and intestines with the stomach. Its position is typical for embryos, i.e. contracted position, hands by the face, legs

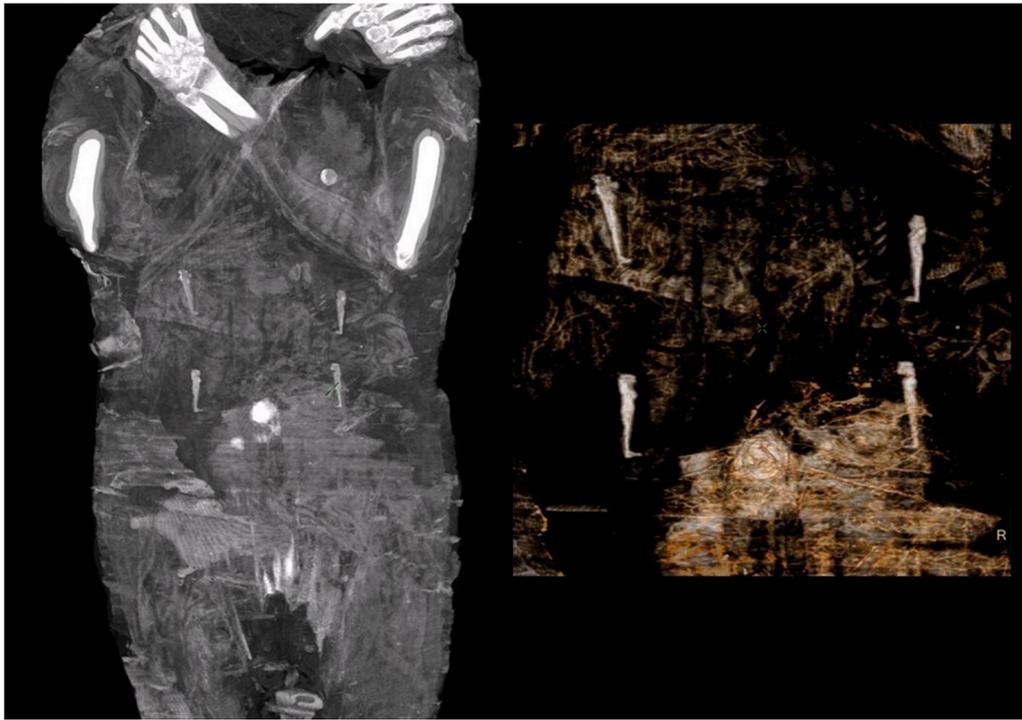


Fig. 5. Abdominal area of the mummy 236805/3 with amulets representing the Four Sons of Horus above the navel area. Concentration of the textiles above the navel is visible in the lower central part of the image (not in this same scale, dimensions of the amulets c. 4 cm, Marcin Jaworski).

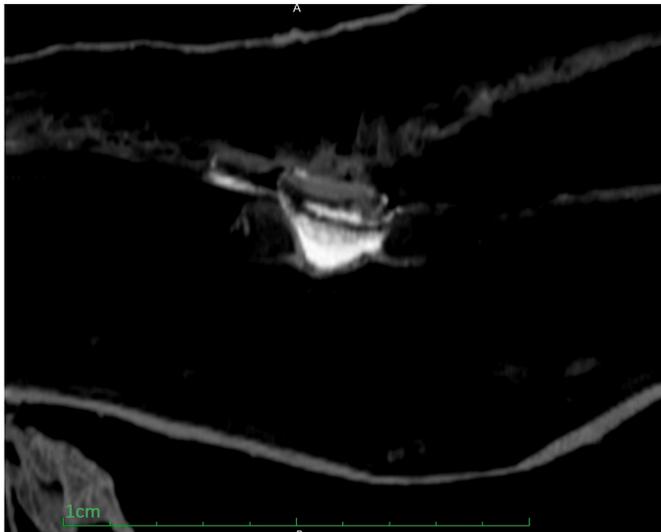


Fig. 6. Sagittal plane cross-section showing the abdominal area of the mummy 236805/3, where the conical-disc and textiles in the navel area are visible (the light spot in the center) (Marcin Jaworski).

rolled up and crossed. Breakages of the fetus' bones are observed, with its skull bones found to be fractured. Moreover, the fetus's body was broken into two parts, probably as a result of the *post mortem* fracture of the mother's pelvis.

The reason the fetus was not extracted and mummified separately, as in other known examples of independently mummified stillborn children (see e.g.: [Hawass and Saleem 2011](#)), is enigmatic. It may have been thought to be still an integral part of the body of its mother, since it was not yet born. On one hand, the individual without a name did not have his distinctiveness secured by having a name. According to ancient Egyptian beliefs, a name was an important part of a human being ([Ikram and Dodson 1998: 18–21](#); [Bonnet 2000](#)). Thus, its afterlife could only

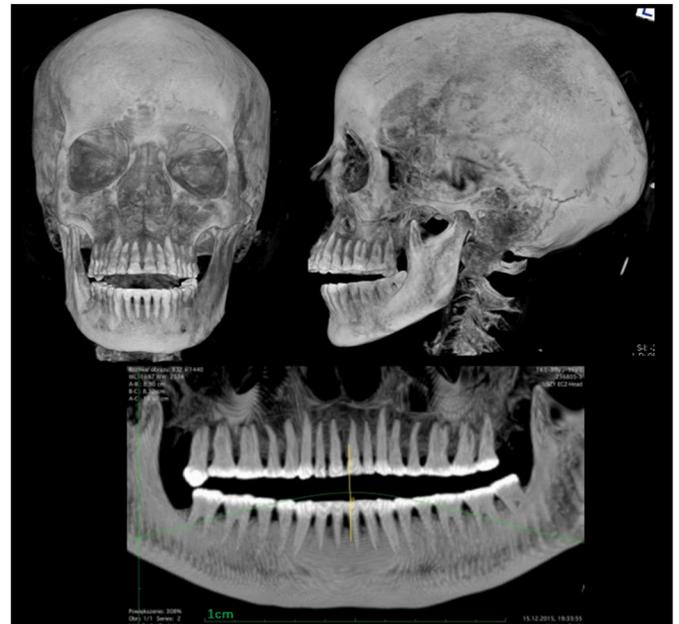
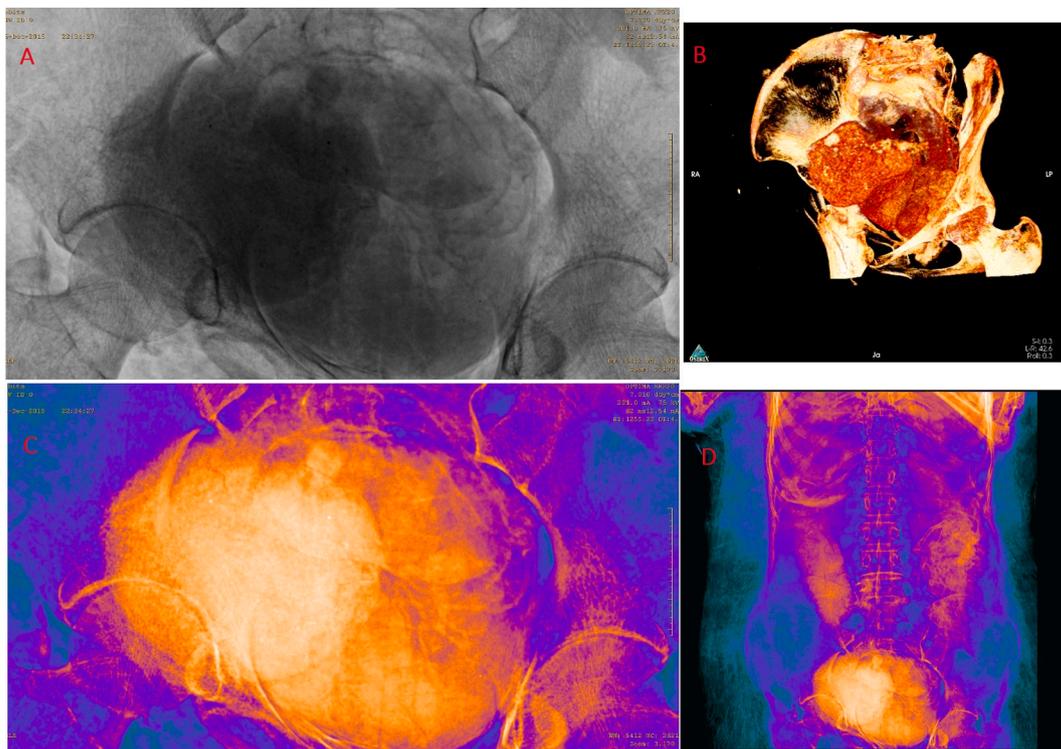


Fig. 7. X-ray of the head and the pantomographic image of the teeth of the mummy 236805/3 (not in this same scale, Marcin Jaworski).

have happened if it had gone to the netherworld as part of its mother. On the other hand, according to Dr Katarzyna Jaroszewska, extracting a fetus in the age of 26–30 weeks is very difficult due to the thickness and hardness of the uterus ([Pai et al., 2015: 3](#); [Daftary et al., 2015](#)). This could result in the inability to mummify the fetus separately without damaging its body or that of its mother.



**Fig. 8.** Abdominal area of the mummy 236805/3; A - X-ray; B - D CT (C and D intensive colour mark the fetus) (Marcin Jaworski and Marzena Ozarek-Szilke). (For interpretation of the references to colour in this figure legend, the reader is referred to the Web version of this article.)

## 7. Conclusion

Maternal mortality is high even nowadays. According to the World Health Organization about 295,000 women died during and following pregnancy and childbirth in 2017 (<https://www.who.int/news-room/fact-sheets/detail/maternal-mortality>; Loudon, 2000). Maternal mortality was much higher in ancient times than it is today, however the approximations are often educated guesses (Cooper and Phelan 2017; Loudon, 2000). There are sources on pregnancy and childbirth in ancient Egypt (Fayad 1998). Until the current discovery our evidence on perinatal health was mostly limited to texts and iconography, because pregnancy and traumatic complications leave little or no osteological evidence (Sullivan 1997). Burials of pregnant women are rarely identified (see e.g. Pitre 2016 et al.; Masterson 2019). Until the current discovery there was no material to perform the first hand examinations related to birth complications and test bodies for use of ancient medical treatments (for ancient medicine related to pregnancy see: Fayad 1998). Presented here find is the only known example of a mummified pregnant woman and the first radiological images of such a fetus. This mummy opens a new possibility for studying pregnancy in ancient times, development of fetuses, and the taphonomic processes of fetuses as well as uteruses. The fact that only non-invasive examinations of this mummy have been conducted so far means that it is intact and can be the subject of future multidisciplinary investigations. For example, an analysis of the intestinal content of the fetus can be compared with current research results of bacterial colonisation to gather information on the development of immunological system (see e.g. Collado and Segata 2020). Further studies of this specimen are necessary and can prove to be beneficial for medical science, especially obstetrics and radiology.

This discovery is also important for studies on ancient interpretations of pregnancy in the context of funerary beliefs. Establishing the meaning of leaving the fetus inside the mother's womb and mummifying both of them together is difficult, but also very interesting. To date, no cases of pregnant mummified individuals have been reported and published, despite discoveries of inhumations of pregnant women, such as for

example the one found by Maria C. Gatto in southern Egypt (Pitre et al., 2016). However, no traces of embalming were reported by the scholar. The case study presented here opens a discussion into the context of the studies of ancient Egyptian religion – could an unborn child go to the netherworld?

A critical approach to interpretations of ancient Egyptian mummies is necessary since many specimens do not match the coffins in which they came to museum collections. Radiological examinations should be undertaken more often, even if such investigations have already been made in the past. The case described here demonstrates that if substantial progress in the development of research methods is made, this can completely change interpretations of some specimens.

The woman in question was carefully mummified, wrapped in fabrics, and equipped with a rich set of amulets. It is not known what other items were inside the textiles of the mummy. Above all, it is unknown who she was. Her mummy represents a fine example of ancient Egyptian embalming skills, thus suggesting her high social standing. The coffin in which she arrived in Warsaw was made in the Theban region. Her alleged findspot in the royal tombs at Thebes cannot be proven, but it also cannot be rejected at this stage of the research. These yet unresolved issues make her the Mysterious Lady of the National Museum in Warsaw.

## Declaration of competing interest

None.

## Acknowledgments

The authors would like to thank the sponsors of the project: the research was possible thanks to the availability of a CT scanner and the radiologist team provided by Affidea Polska at the Affidea Clinic in Otwock; X-Ray photos were taken with the support of General Electric; and special thanks go to the Grey Group company for the media campaign, which made the project widely known. The authors also would like thank the National Museum in Warsaw and the University of

Warsaw for making the collection available for the research of the Warsaw Mummy Project and for their support. All visualisations were made on a computer and software financed by the Rector of the University of Warsaw. Gynaecological and obstetric scientific consultation of pregnancy and fetus was kindly provided by Dr Katarzyna Jaroszewska. The authors also would like to thank "Cultivate" Foundation for financial support of the project.

## Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.jas.2021.105371>.

## Declarations

Funding (information that explains whether and by whom the research was supported/financial support).

Conflicts of interest/Competing interests (include appropriate disclosures): not applicable.

Availability of data and material (data transparency): not applicable.

Code availability (software application or custom code): not applicable.

Authors' contributions (optional: please review the submission guidelines from the journal whether statements are mandatory): not applicable.

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