Clinical history and working diagnosis on the referral:

A 15 day old girl presented with raised inflammatory markers (white cell count 19.6 x 10^9/L, CRP 20mg/L) and raised bilirubin (28umol/L). She had blood cultures and cerebrospinal fluid (CSF) tap to assess for meningitis, and both were found to be negative for organism growth. On clinical examination, she was found to have an incidental palpable lump in the right groin, and was referred for ultrasound to assess for the cause. Ultrasound (US) demonstrated a non-reducible 1.8 x 0.9cm right inguinal hernia (picture 1) with a 0.6cm neck. The contents showed soft tissue containing anechoic follicles (picture 2, picture 3), and the neck of the hernia showed marked vascularity (picture 4). Appearances were consistent with the right ovary within a right inguinal hernia sac.

Normal variant:

The ovaries descend during embryonic development from the upper lumbar region at week 6 and relocate to the pelvis. Gonadal descent can arrest at any stage of this process, resulting in an aberrantly placed but otherwise normal ovary. This case demonstrates a right ovary which has descended further than normal into a patent canal of Nuck, a structure which is homologous to the processus vaginalis in males. The canal of Nuck extends anteriorly from the round ligament of the uterus through the inguinal canal and into the labia majora. This sac normally obliterates by 1 year of age, but if remains patent forms the Nuck diverticulum into which the ovary (and other pelvic structures) can descend within the female inguinal canal, resulting in indirect inguinal herniation of the ovary (picture 6) and other pelvic structures.
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Additional information

Underlying step in embryological development:
At week 6-8 of embryological development (picture 7), the gonads are undifferentiated. In the absence of testosterone, the female mesonephros atrophies and the upper gubernaculum becomes the ovarian suspensory ligament, connecting the upper pole of the ovary to the upper rear body wall. The lower gubernaculum attaches to the inferior pole of the ovary to become the ovarian ligament, and further down becomes the round ligament of uterus, which extends into the inguinal canal terminating in the labia majora (picture 8). Continuation of ovarian descent in combination with a patent canal of Nuck allows for herniation of the pelvic organs, including the ovary, uterus and fallopian tubes, through the deep inguinal ring into the inguinal canal and labia majora (picture 6).

Potential differential diagnostic entities:
• Inguinal hernia
• Hydrocele of canal of Nuck
• Endometriosis (adults)
• Inguinal lymphadenopathy

In case you want to submit further pictures, please add these (radiograph, ultrasound, CT or MR images) and schematic drawing of the developmental process if applicable by clicking on the symbols within the boxes below:

![Picture 3: Anechoic <5mm foci within the hernial sac, consistent with ovarian follicles](image)

![Picture 4: Doppler USS with ovarian vessels seen at the neck of the hernia](image)
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**Additional pictures**

In case you want to submit further pictures, please add these (radiograph, ultrasound, CT or MR images) and schematic drawing of the developmental process *if applicable* by clicking on the symbols within the boxes below:

**Picture 5:** Normal female reproductive anatomy and inguinal canal

**Picture 6:** Persistent canal of Nuck containing left ovary and fallopian tube

**Picture 7:** Gonadal position week 7 of embryological development

**Picture 8:** By 7 months, the ovaries are in normal anatomical position within the pelvis.

**References**

- Adapted from *Human embryology: organogenesis 21.3 Differentiation of the gonads*. Last accessed 10/01/18 http://www.embryology.ox.ac.uk/atlases/gonage/diffsexpho.html