Parasitic Twins

SUNY Downstate Medical Center
Pediatric Surgery
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A full-term baby girl born to a xx yo healthy female via c-section

Maternal history:
- P2042
- HIV/ Hep B/ VDRL negative, Rubella immuned
- prenatal sonogram showed possible meningocele and left lower extremity agenesis
- amniocentesis analysis: 46: XX: gene deletion at locus 22 of X chromosome
Case

- Apgars score: 1min – 4, 5 min – 6, 10min – 7
- No spontaneous breathing
- HR < 100, sat 50%
- A large defect and a soft tissue mass noted at left lower quadrant
- Imperforate anus
- 2 vessels cord
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Case
Pre-op Differential Diagnoses

- Cloacal exstrophy
- Meningomyelocele
- Incomplete conjoined twins
Operation

Part I: Excision of meningocèle

Part II: Exploratory laparotomy

Part III: GU system identification

Part IV: Excision of malformed tissue

Part V: End colostomy creation
Part II: Exploratory Laparotomy
Part II: Exploratory laparotomy
Part II: Exploratory laparotomy
Part III: GU system identification
Part III: GU system identification

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Part III: GU system identification
Part IV: Excision of the malformed tissue
Part IV: Excision of the malformed tissue
Part V: Creation of colostomy
<table>
<thead>
<tr>
<th>Tissue source</th>
<th>Final Pathology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unknown foreign tissue</td>
<td>Fragments of skin (scalp), bone and glial tissue</td>
</tr>
<tr>
<td>r/o ectopic kidney tissue</td>
<td>Fragments of glial vascular tissue with squamous epithelium, ependymal lining and papillary structure lined by simple columnar epithelium</td>
</tr>
</tbody>
</table>
| r/o ectopic adrenal tissue        | Ectopic adrenal gland  
Fragments of thymus, pancreatic, gastric, small intestine and esophageal tissue  
Fragments of tissue from the respiratory tract |
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<tbody>
<tr>
<td>r/o bladder tissue</td>
<td>Fragments of glial tissue, cartilage with bronchial type glands and gastrointestinal mucosa</td>
</tr>
<tr>
<td>Distal colon</td>
<td>Segment of colon, meconium filled Fragments of fat with adjacent fibrous tissue</td>
</tr>
<tr>
<td>Meninges</td>
<td>Fragments of glial tissue with squamous mucosa</td>
</tr>
<tr>
<td>Tooth</td>
<td>Tooth</td>
</tr>
</tbody>
</table>
Post-op Course

- Resolving renal failure, not necessitating dialysis
- Cr improved to 0.6 before being discharged home
- Seen by orthopedics surgery for evaluation of left lower extremity prosthesis
Questions?
Parasitic Twins
Contents

- Early Human Embryology
- Concept of twinning
- Introduction
- Etiology and pathogenesis
- Diagnosis
- Case reports
- Management
- Prognosis
- Conclusions
Early Human Embryology (week-1)

- Fertilization → Cleavage → Blastocyst Formation → Implantation
Early Human Embryology

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Concept Of Twinning

Zygosity
Chorionicity
Amniocity
Concept of Twinning

a) Identical (Monozygotic) Twins

b) Fraternal (Dizygotic) Twins

(Shared placenta)  (Separate placentas)
Concept of Twinning

- Morula
  - Cleavage: Days 1-8
  - Dichorionic/Diamniotic

- Blastocyst
  - Cleavage: Days 4-8
  - Monochorionic/Diamniotic

- Implanted Blastocyst
  - Cleavage: Days 8-15
  - Monochorionic/Monoamniotic

- Formed Embryonic Disc
  - Cleavage: Days 18-15
  - Conjoined Twins
Concept Of Twinning

Twins

Monozygotic
- Dichorionic
  - Monoamniotic
- Monochorionic
  - Monoamniotic

Dizygotic
- Conjoined twins
  - Symmetrical
  - Asymmetrical
Symmetrical Conjoined Twins
Conjoined Twins

Ischiopagus tripus
Asymmetrical Conjoined Twins

Parasitic Twins

Fetus-in-fetu
The overall incidence of twinning about 1:87 of all births
Wide variations in the incidence of dizygotic twinning but constant in monozygotic twinning, 3.5 per 1,000 pregnancies
Monozygotic twins account for one third of twin births
Conjoined twins account for 1% of monozygotic twins
Parasitic/ heteropagus twins are estimated to account <5% of conjoined twins
Introduction

- Parasitic twins occurs when there is a parasite attachment in a nonduplicated fashion to any part of the body of the autosite
- Incidence 1 in 50,000 to 100,000 live births

Etiology and Pathogenesis
## Fission or Fusion?

<table>
<thead>
<tr>
<th><strong>Fission</strong></th>
<th><strong>Fusion</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary hypothesis</td>
<td>Union of two initially distinct embryos that took place during early embryonic period</td>
</tr>
<tr>
<td>Failure of a single zygote to divide completely</td>
<td>Logrono et al: DNA study demonstrated dizygosity in a pair of parasitic twins</td>
</tr>
</tbody>
</table>

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Pathogenesis

- It is postulated that parasitic twin occur as a result of selective ischemic damage in utero
- Resulting in death and partial resorption of one of the twins and eventuates in an incomplete parasitic twin attached to a fully developed twins
- Mechanism maybe similar to that which produces acardiac twins

Acardiac Twins

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Diagnosis
Diagnosis

- **Prenatal**
  usually by obstetric sonogram

- **Postnatal**
  combination of different modalities
  xray, sonogram, MRI, CT
Case Reports
A 2.3 kg full term baby girl was born by C-section to healthy parents.

- No fetal abnormality suspected prenatally.
- No h/o maternal illness or drug intake during pregnancy.
- No h/o congenital anomalies in family.
- Has three other healthy siblings.
- At birth, a 11 x 8 cm mass was attached to the lumbosacral region with bony structure underneath.
A 2.7kg full-term baby girl was born to a young healthy woman via normal vaginal delivery.

No h/o maternal illness or drug intake during pregnancy.

No h/o congenital anomalies in family.

At birth, a parasitic twin was found attached to her left lumbar region.

Also found to have a major exomphalos with a transparent sac, underneath which necrotic bowel was visible.
Asymmetric Conjoined Twins: Atypical Ischiopagus Parasite (2007)

Chandigarh, India
Asymmetric Conjoined Twins: Atypical Ischiopagus Parasite (2007)
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Management
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Management

Recognition

X-ray, sonogram, CT, MRI
Unlike symmetrical conjoined twins, parasitic twins often do not share major organs.

Thus surgical separation for parasitic twins is less complicated.

Prognosis

- The outcome of the autosite after surgical intervention is usually favorable
- No occurrence of recurrence

Nisreen M Khalifa, Doaa W Maximous, Alaa A Abd-elsayed. Department of Pediatric Oncology/Surgical oncology/Public Health and Community Medicine, South Egypt Cancer Institute, Asdiut University, Egypt. Fetus in fetu: A case report.  
Conclusions

- Parasitic twins are rare, account for less than 5% of conjoined twins
- Theory of “fission” or “fusion”
- Occur as a result of selective ischemic damage in utero
- Prenatal diagnosis is possible by sonogram
- Surgery is the mainstay treatment to separate the parasite from the autosite, less complicated than conjoined twins separation
- The prognosis of the autosite after surgical intervention is excellent

2. Nisreen M Khalifa, Doaa W Maximous, Alaa A Abd-elsayed. Department of Pediatric Oncology/ Surgical oncology/ Public Health and Community Medicine, South Egypt Cancer Institute, Asdiut University, Egypt. Fetus in fetu: A case report. 

3. 22q11.2 deletion syndrome. 
   http://en.wikipedia.org/wiki/22q11.2_deletion_syndrome


References


Question 1

Which of the following is true?

(a) Fusion is the primary theory for conjoined twins
(b) The latter the cleavage, the higher chance of conjoined embryos in early human embryology
(c) Asymmetrical conjoined twins are more common than symmetrical conjoined twins
(d) Separation surgery is more complicated in asymmetrical conjoined twins
Question 2

What is the estimated incidence of parasitic twins?

(a) 1 in 100 live births
(b) 1 in 1000 live births
(c) 1 in 10,000 live births
(d) 1 in 100,000 live births
Question 3

What is the postulated mechanism of parasitic twins?
(a) Maternal malnutrition
(b) Maternal trauma
(c) Fetal neoplastic growth
(d) Twins Reversed Arterial Perfusion syndrome in acardic twins
Which is the most common type of conjoined twins?

(a) Thoragopagus
(b) Craniopagus
(c) Pygopagus
(d) Omphalopagus
Question 5

What is the recurrence rate for parasitic twins after surgical Intervention?
(a) None
(b) < 2%
(c) 10%
(d) 50%