CASE REPORT - SUPPLEMENTARY MATERIALS

Painful ultrasound detected lesion in the proximal part of the corpus cavernosum: A case of so called “partial priapism”?

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DISCUSSION
Performing a PubMed search with the key word “Partial priapism” or “Segmental priapism” we founded 55 cases, reporting different etiologic hypothesis. Therapeutic management was conservative or invasive with different medication or technique applied (Table 1, 2). During the time, from the first case described by Hillis (2), in which treatment option was an incision, irrigation of corpus cavernosum with the excision of a thin membrane localized between normal and affected tissue, the choice about treatment not seems related to a precise indication. Instead, the therapeutic management was related to increased knowledge of this clinical entity. In fact, in the early years, it was more frequent the choice of an invasive approach regardless of the clinical response to medical therapy. Only recently, the use of invasive procedures and surgery was reserved for situations of unresponsiveness to treatment of symptoms. Several cases had been recently reported. Del Villar et al. (3) presented a case of a 22-year-old patient, with no history of trauma or medical or surgical treatment, complaining right testicle and penile base pain on erection for 15 days. Erectile function was referred as not altered. Use of drugs or intracavernosal injection was denied. On physical examination patient exhibited stiffness of the right corpus cavernosum at the base of the penis and the crural area, with mild tenderness on in-depth palpation. Patient’s blood tests were normal. The Doppler ultrasound examination revealed an increase in the entire right crus of the corpus cavernosum due to the presence of sinusoids involving liquid content without internal Doppler flow. Authors performed a gadolinium-enhanced Magnetic Resonance (MRI) revealing corpus cavernosum asymmetry with a larger volume of the right proximal segment and spontaneous T1 hyper-intensity and a 7.5 cm T2 hypo-intense image consistent with segmental cavernosal thrombosis. A conservative management was indicated with 375 mg daily of acetylsalicylic acid (ASA) plus gastric protection with omeprazole over a period of two weeks. After one month, patient’s condition remained unchanged. Phillips et al. (4) presented a case of corpus cavernosum hematoma mimicking priapism in a 42-year-old man. Examination revealed partial erection and palpable space-occupying lesion of the corpus cavernosum without lymphadenopathy. Malignant workup was negative. Imaging assisted in diagnosis of unilateral hematoma of the corpus cavernosum. The lesion spontaneously resolved without the need for intervention. Kropman and Schipper (1) described a case of a 38-year-old caucasian male complaining a one day history of perineal discomfort and a swelling at the right base of his penis started during a prolonged car drive. To make a diagnosis, they performed an ultrasound perineal evaluation and than a MRI with evidence, in T1 and in T2 weighted signal intensities. a mass of 2 × 7 cm in the proximal part of the right corpus cavernosum with a well-defined abrupt change to the normal distal part. No enhancement of the mass after contrast injection with gadolinium was seen, suggesting absence of flow. The patient was prescribed diclofenac 50 mg 4 dd for the pain and the swelling. At a follow-up of one month the pain had become much less. After half a year the patient had no complaints. Recently, in a multicentre retrospective analysis, Wayne et al. (5) presented 15 cases of idiopathic partial thrombosis (IPT). Patients most frequently presented with perineal pain and swelling or pain during erection. Most patients reported being a frequent cyclist with the episode of IPT occurring after cycling activity. Clotting tests (raised D-dimers in 40% of cases), ultrasound and MRI were performed in all cases. The authors underlines the need of MRI evaluation in diagnostic work up because of the possibility to diagnose a “cavernous web” which was a common findings in almost all patients. Therapy was initially conservative (low molecular weight heparin in prophylactic or therapeutic dose) with concomitant or consequent anti-aggregant therapy. Complete resolution was observed in most of the cases. In case of failure, surgical incision of the web with saphenous graft repair or Heincke Mikulicz reconstruction was performed with good functional outcome. Cooper et al. (6) published a case of partial priapism in a 26 years old man presented to the emergency department with severe, right-sided perineal pain of 24 hours duration. He denied any trauma but did have mild dysuria. Computed tomography (CT) of the pelvis showed asym-
metric enlargement of the proximal right corpus cavernosum with an area of thin hyperdense tissue distal to the enlarged region. After a first discharge with antibiotic therapy (ciprofloxacin), the patient returned to the hospital three days later complaining worsening of right sided perineal pain. The repeat pelvis CT showed the same picture, with a hyperdense membrane distal to the right proximal corporal thrombosis. At this time, the therapy was also conservative with prescription of ibuprofen 800mg three times daily, acetylsalicylic acid 325 mg daily and pentoxifylline 400mg twice daily. After six weeks of therapy and at three months follow up, a complete recovery was observed.

The patient referred no impairment of sexual function and no relapses of symptoms. Also Gresty et al. (7) presented two cases managed conservatively. Although both patients reported resolution of local symptoms, formal analysis of sexual function at follow-up review has revealed that only one achieved complete recovery. In general, a painful perineal mass was the recurrent symptom of presentation in each case described in literature. The cause of this condition remains unclear. When surgery was the therapeutic option, a thin membrane was found that separated the erect from flaccid part of the corpus cavernosum (2-4-5). It is unclear if this findings was expression of an innate web predisposing to develop the thrombus, as suggested by Hillis et al. (2) or if this fibrous septum was consequence of a traumatic event (3). But how to explain partial priapism when patient history is negative for trauma (e.g. during sexual intercourse or cycling)?. As it was in our case, patient referred an acute onset of symptoms without any related event. Thus, such in others experiences report ed in the literature (see references on Tables 1, 2) , the etiology of the presented case was unclear and must be considered idiopathic. Instrumental investigations for diagnosis was mandatory. In case of clinical findings suggesting for this condition, perineal ultrasound with color Doppler evaluation may lead to demonstrate the initial hypothesis of partial or segmental priapism. In our opinion, ecocolorDoppler may be the only instrumental diagnostic

### Table 1.
Cases of "partial" or "segmental" priapism treated by an operative approach and listed per years of publication.

<table>
<thead>
<tr>
<th>Reference</th>
<th>Year of publication</th>
<th>Age (years)</th>
<th>Race</th>
<th>Possible etiology</th>
<th>Side affected</th>
<th>Laboratory results</th>
<th>Instrumental work up</th>
<th>Type of operative management</th>
<th>Follow up</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>1976</td>
<td>24</td>
<td>Black</td>
<td>Idiopathic</td>
<td>Prox left/right</td>
<td>Normal</td>
<td>Ultrasound echocolorDoppler/Gadolinium-MRI</td>
<td>Incision, irrigation, excision membrane</td>
<td>Complete recovery</td>
</tr>
<tr>
<td>16</td>
<td>1976</td>
<td>34</td>
<td>Caucasian</td>
<td>Prolonged sexual intercourse</td>
<td>Prox right</td>
<td>Normal</td>
<td>-</td>
<td>Exploration, irrigation</td>
<td>Complete recovery</td>
</tr>
<tr>
<td>9</td>
<td>1980</td>
<td>23</td>
<td>Caucasian</td>
<td>FuO since 2,5 years</td>
<td>Prox left/right</td>
<td>Normal</td>
<td>-</td>
<td>Compression, irrigation, shunt</td>
<td>Recovery</td>
</tr>
<tr>
<td>5</td>
<td>1980</td>
<td>34</td>
<td>Caucasian</td>
<td>Prolonged sexual intercourse</td>
<td>Prox right</td>
<td>Normal</td>
<td>-</td>
<td>Incision, irrigation, excision membrane (Thrombosis)</td>
<td>Recovery</td>
</tr>
<tr>
<td>27</td>
<td>1981</td>
<td>-</td>
<td>-</td>
<td>Idiopathic</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>Incision</td>
</tr>
<tr>
<td>17</td>
<td>1985</td>
<td>21</td>
<td>-</td>
<td>Idiopathic</td>
<td>Prox left</td>
<td>Normal</td>
<td>CT scan</td>
<td>Exploration, biopsies (Thrombosis)</td>
<td>Complete recovery</td>
</tr>
<tr>
<td>18</td>
<td>1986</td>
<td>27</td>
<td>Caucasian</td>
<td>Idiopathic</td>
<td>Prox left</td>
<td>Normal</td>
<td>-</td>
<td>Evacuation, irrigation</td>
<td>Complete recovery</td>
</tr>
<tr>
<td>23</td>
<td>1988</td>
<td>24</td>
<td>-</td>
<td>Congenital spherocytosis-no trauma</td>
<td>Prox left</td>
<td>-</td>
<td>Cavemosography/ CT scan</td>
<td>Incision (hematoma evacuation) 5 weeks after symptoms onset and saline/heparin irrigation</td>
<td>Recovery</td>
</tr>
<tr>
<td>24</td>
<td>1993</td>
<td>34</td>
<td>-</td>
<td>Idiopathic</td>
<td>Prox left and right</td>
<td>-</td>
<td>-</td>
<td>Incision; exploration after NSAID and LMWH l.v.</td>
<td>Complete recovery</td>
</tr>
<tr>
<td>22</td>
<td>1995</td>
<td>47</td>
<td>-</td>
<td>Idiopathic</td>
<td>Distal, midline</td>
<td>Normal</td>
<td>Ultrasound echocolorDoppler</td>
<td>Incision (excavation of organizing hematoma) No palpable residual mass</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>1997</td>
<td>29</td>
<td>-</td>
<td>Idiopathic</td>
<td>Prox right</td>
<td>Normal</td>
<td>-</td>
<td>Puncture of right crus, saline irrigations, erythromycin injection</td>
<td>Complete recovery</td>
</tr>
<tr>
<td>15</td>
<td>1998</td>
<td>44</td>
<td>-</td>
<td>Long bicycle ride the day before</td>
<td>Prox left</td>
<td>Normal</td>
<td>-</td>
<td>Puncture of left crus, LMWH l.v. for 15 days, aspirin for 6 months</td>
<td>Complete recovery</td>
</tr>
<tr>
<td>19</td>
<td>1999</td>
<td>24</td>
<td>Caucasian</td>
<td>Prolonged erection 2 days before</td>
<td>Prox left</td>
<td>Slightly elevated white blood count</td>
<td>CT scan/ MRI</td>
<td>Incision, membrane resection</td>
<td>Decrease of symptoms, scar formation</td>
</tr>
<tr>
<td>20</td>
<td>2001</td>
<td>33</td>
<td>-</td>
<td>After sexual intercourse- no trauma</td>
<td>Prox left</td>
<td>Urine test positive for cannabinoids</td>
<td>-</td>
<td>Exploration, irrigation, shunt after unsuccessful intracavernous injection of phenylephrine</td>
<td>Complete recovery</td>
</tr>
<tr>
<td>20</td>
<td>2001</td>
<td>24</td>
<td>-</td>
<td>After sexual intercourse- no trauma</td>
<td>Prox left and right</td>
<td>Positive for Sickle cell test</td>
<td>-</td>
<td>Cavemosal-spongiosum shunt</td>
<td>Post operative erectile dysfunction resolved later</td>
</tr>
<tr>
<td>21</td>
<td>2004</td>
<td>32</td>
<td>Caucasian</td>
<td>Bicycle ride (mountain bike) the day before-no trauma</td>
<td>Prox right</td>
<td>Normal</td>
<td>Ultrasound/ MRI</td>
<td>Surgical exploration (hematoma evacuation)</td>
<td>Recovery</td>
</tr>
<tr>
<td>26</td>
<td>2009</td>
<td>-</td>
<td>-</td>
<td>Tamsulosin 0.4 mg used the day before</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>Incision</td>
<td>Complete recovery</td>
</tr>
<tr>
<td>8</td>
<td>2012</td>
<td>51</td>
<td>Caucasian</td>
<td>Idiopathic</td>
<td>Prox left and right</td>
<td>-</td>
<td>Ultrasound echocolorDoppler/ MRI</td>
<td>Intracavernous injection of ethylphrine and acenocoumarol (60 days)</td>
<td>Incomplete recovery of erectile function (treated with PDE5)</td>
</tr>
<tr>
<td>25</td>
<td>2013</td>
<td>50</td>
<td>Caucasian</td>
<td>Sodium 100 mg used the day before</td>
<td>Prox left</td>
<td>-</td>
<td>-</td>
<td>Surgical incision and clot evacuation (unsusceptiveness to analgesics)</td>
<td>Complete recovery</td>
</tr>
<tr>
<td>5</td>
<td>2015 **</td>
<td>-</td>
<td>-</td>
<td>Cyclist rider</td>
<td>-</td>
<td>D-dimers Elevation</td>
<td>Ultrasound/ MRI</td>
<td>Surgical incision and saphenous graft repair</td>
<td>4 of 15 patients surgically treated</td>
</tr>
</tbody>
</table>

**case series of 15 patients.
method considering that MRI or Computed Tomography or cavernosography or contrast enhanced ultrasound has not added relevant diagnostic elements in each case in which they were employed (see references on Tables 1, 2). Ultrasonographic features, consisting in hypo-anechoic areas without visible blood flow, may be considered pathognomonic (1, 2, 12, 13). Therefore, invasive diagnostic methods should be avoided also in consideration of the fact that the sudden onset of the phenomenon is unlikely related to a tumor of the penis (14) which however is very rare in the proximal part of the corpus cavernosum. The therapeutic options proposed include: conservative management, surgical corporotomy, cavernosum-spon-

**Table 2.**

Cases of “partial” or “segmental” priapism managed with conservative approach and listed per years of publication.

<table>
<thead>
<tr>
<th>Reference</th>
<th>Year of publication</th>
<th>Age (years)</th>
<th>Race</th>
<th>Possible etiology</th>
<th>Side affected</th>
<th>Laboratory results</th>
<th>Instrumental work-up</th>
<th>Therapy</th>
<th>Follow up</th>
</tr>
</thead>
<tbody>
<tr>
<td>29</td>
<td>1988</td>
<td>51</td>
<td>-</td>
<td>No trauma</td>
<td>Prox left</td>
<td>-</td>
<td>Ultrasound ecocolordoppler/Gadolinium MRI</td>
<td>No therapy</td>
<td>Decrease of symptoms</td>
</tr>
<tr>
<td>29</td>
<td>1988</td>
<td>37</td>
<td>-</td>
<td>No trauma</td>
<td>Prox left</td>
<td>Normal</td>
<td>Ultrasound ecocolordoppler/Gadolinium MRI</td>
<td>No therapy</td>
<td>Decrease of symptoms</td>
</tr>
<tr>
<td>6</td>
<td>1994</td>
<td>27</td>
<td>Caucasian</td>
<td>No trauma</td>
<td>Prox right</td>
<td>Normal</td>
<td>Gadolinium MRI</td>
<td>Heparin, propopyxone</td>
<td>Complete recovery</td>
</tr>
<tr>
<td>30</td>
<td>1998</td>
<td>35</td>
<td>Caucasian</td>
<td>No trauma</td>
<td>Prox left</td>
<td>Elevated white blood count</td>
<td>Ultrasound ecocolordoppler/Gadolinium MRI</td>
<td>Heparin i.v., Acetylsalicylic acid</td>
<td>Complete recovery</td>
</tr>
<tr>
<td>10</td>
<td>2002</td>
<td>46</td>
<td>-</td>
<td>No trauma</td>
<td>-</td>
<td>Liver enzymes slightly increased</td>
<td>Ultrasound ecocolordoppler/Gadolinium MRI</td>
<td>Heparin i.v., 30000IU/24h, later acetylsalicylic acid 100 mg/day</td>
<td>Fibrous residuum at MRI; cavernosography as follow-up; erectile function conserved</td>
</tr>
<tr>
<td>14</td>
<td>2003</td>
<td>18</td>
<td>Caucasian</td>
<td>After cycling, no trauma</td>
<td>Prox right</td>
<td>Normal</td>
<td>Ultrasound ecocolordoppler/Gadolinium MRI</td>
<td>LMWH</td>
<td>Complete recovery</td>
</tr>
<tr>
<td>14</td>
<td>2003</td>
<td>22</td>
<td>Caucasian</td>
<td>After airplain flight, cyclist</td>
<td>Prox left</td>
<td>Normal</td>
<td>Ultrasound ecocolordoppler/Gadolinium MRI</td>
<td>Acetylsalicylic acid</td>
<td>Complete recovery</td>
</tr>
<tr>
<td>14</td>
<td>2003</td>
<td>27</td>
<td>Caucasian</td>
<td>Cyclist</td>
<td>Prox right</td>
<td>Normal</td>
<td>Ultrasound ecocolordoppler/Gadolinium MRI</td>
<td>Acetylsalicylic acid</td>
<td>Complete recovery</td>
</tr>
<tr>
<td>7</td>
<td>2005</td>
<td>37</td>
<td>-</td>
<td>Cocaine and marijuana abuse on day of onset of symptoms</td>
<td>Prox right</td>
<td>Normal</td>
<td>Ultrasound ecocolordoppler/Gadolinium MRI</td>
<td>Pain medication, hydration</td>
<td>Complete recovery</td>
</tr>
<tr>
<td>31</td>
<td>2009</td>
<td>22</td>
<td>-</td>
<td>-</td>
<td>Prox left</td>
<td>-</td>
<td>MRI</td>
<td>NSAD, aspirin</td>
<td>-</td>
</tr>
<tr>
<td>28</td>
<td>2011</td>
<td>32</td>
<td>Caucasian</td>
<td>Sexual arousal without intercourse</td>
<td>Prox right</td>
<td>Slightly elevated white cells count</td>
<td>Ultrasound ecocolordoppler</td>
<td>15,000 IU of dalteparin daily, given subcutaneously</td>
<td>Recovery</td>
</tr>
<tr>
<td>32</td>
<td>2013</td>
<td>19</td>
<td>Caucasian</td>
<td>Mountain biking</td>
<td>Prox right</td>
<td>Normal</td>
<td>MRI</td>
<td>LMWH and NSAD</td>
<td>Proximal fibrosis</td>
</tr>
<tr>
<td>32</td>
<td>2013</td>
<td>32</td>
<td>Caucasian</td>
<td>Masturbation</td>
<td>Prox left</td>
<td>Normal</td>
<td>MRI</td>
<td>LMWH and aspirin</td>
<td>-</td>
</tr>
<tr>
<td>32</td>
<td>2013</td>
<td>35</td>
<td>Caucasian</td>
<td>Transatlantic flight and biking</td>
<td>Prox right</td>
<td>Normal</td>
<td>MRI</td>
<td>LMWH and aspirin</td>
<td>-</td>
</tr>
<tr>
<td>33</td>
<td>2014</td>
<td>23</td>
<td>Caucasian</td>
<td>-</td>
<td>Prox bilateral</td>
<td>Normal</td>
<td>CEUS, MRI</td>
<td>Enoxaparin 40 mg once daily and acetylsalicylic acid 100 mg once daily</td>
<td>Complete recovery</td>
</tr>
<tr>
<td>1</td>
<td>2014</td>
<td>38</td>
<td>Caucasian</td>
<td>2-hour car drive; sexual intercourse the night before onset of symptoms</td>
<td>Prox right</td>
<td>Slightly elevated K+</td>
<td>-</td>
<td>NSAD</td>
<td>Complete recovery</td>
</tr>
<tr>
<td>3</td>
<td>2014</td>
<td>22</td>
<td>-</td>
<td>Idiopathic</td>
<td>Prox right</td>
<td>Normal</td>
<td>Ultrasound ecocolordoppler/Gadolinium MRI</td>
<td>Acetylsalicylic acid 375 mg daily for two weeks and than 100 mg for maintenance</td>
<td>Recovery</td>
</tr>
<tr>
<td>4</td>
<td>2015</td>
<td>42</td>
<td>Caucasian</td>
<td>-</td>
<td>Prox right</td>
<td>Normal</td>
<td>Ultrasound ecocolordoppler</td>
<td>No therapy</td>
<td>Complete recovery</td>
</tr>
<tr>
<td>5</td>
<td>2015**</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>D-dimers elevation</td>
<td>Ultrasound/ MRI</td>
<td>LMWH</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>2015</td>
<td>26</td>
<td>Caucasian</td>
<td>Idiopathic</td>
<td>Prox right</td>
<td>-</td>
<td>Cl</td>
<td>NSAD (ibuprofen 800 three times daily) Pentaerythrine 400 twice daily Acetylsalicylic acid 325 mg daily (for six weeks)</td>
<td>Complete recovery without sexual dysfunction</td>
</tr>
<tr>
<td>7</td>
<td>2015</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>Complete recovery of sexual function in one of two patients</td>
<td></td>
</tr>
</tbody>
</table>

**Case series of 15 patients.**
giosum shunt and intracavernous injection of ethylephrine (11, 15).
In our reported case we opted for a conservative approach
suffering symptomatic and anti-inflammatory drugs to
systemic anticoagulants due to the risk of low molecular
weight heparin induced priapism due to heparin-induced
thrombocytopenia (16). Operative treatment should be
implemented only in selected cases (5, 8, 9, 16). As sug-
gested by Kropman and Schipper (2), although partial pri-
apism is the commonly used term to characterize this
unusual clinical condition, we believe that symptoms and
imaging findings are related to an interstitial hematoma
rather than to a real priapism, especially in case of idiop-
athic etiology.
In fact, if during a low flow priapism all sinusoids of the
corpus cavernosum are dilated and completely filled by
venous blood, why only a part of the corpus should be
involved? On the other hand, in case of high flow pri-
apism, the flow of blood is constant and it presents no
abrupt stop. The “septum” described by some authors (3,
5, 12) may be related to a traumatic event and is not jus-
tifiable in cases without precise origin. In addition, how
to justify the partial thrombosis theory (9-11) if patients
were in most cases able to maintain its erectile ability?
We believe that in our reported case, symptoms and
ultrasound findings were related to an interstitial hematoma
as well as demonstrated by the ultrasound evolution of the
hypo-echoic lesions which become hyper-echoic after a few
days from the onset of symp-
toms.

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thrombosis is associated with cycling and the presence of a fibrous
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