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RESEARCH ARTICLE

Role of Ultrasonography in Evaluation of Pilonidal Disease

Pilonidal Sinüsün Değerlendirilmesinde Ultrasonografinin Rolü

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ABSTRACT

Aim: Pilonidal disease (PD) generally occurs in the sacrococcygeal region and physical examination (PE) is the main diagnostic method. However, imaging methods such as ultrasonography (USG) may be necessary to evaluate PD in some cases. The aim of this study was to evaluate the use of USG in PD.

Method: PD patients who underwent preoperative superficial USG between January 2012 and December 2013 were evaluated retrospectively. Age, sex, body mass index (BMI), duration of complaints, distance from anal verge, number of inactive or active sinus orifices, anesthesia type, and PD dimensions and distal and proximal borders in PE, USG, and postoperative exploration (EXP) were evaluated. T-test and Pearson's correlation were used for statistical analysis.

Results: Forty patients were included in the study. All patients were male (100%), mean age was 22.82±2.77 years, and mean BMI was 24.96±2.35 kg/cm^2. Surgery was conducted under local anesthesia for 72.5% of the patients. Mean PD dimensions on USG were significantly larger in patients operated under spinal anesthesia (p=0.01). The correlation of dimensions between PE and EXP was 0.72 (good) (p=0.0001) and correlation between USG and EXP was 0.51 (moderately good) (p=0.001). The correlation of distal and proximal borders between PE and EXP was 0.564 (good) and between USG and EXP was 0.368 (moderate) (p=0.0001, p=0.02 respectively).

Conclusion: Physical examination is a simple and highly accurate diagnostic modality for determining dimensions and borders of PD. USG dimensions are beneficial for determining suitable anesthesia type. Hydrogen peroxide-enhanced USG or magnetic resonance imaging can be used for advanced evaluation of PD.

Keywords: Pilonidal disease, physical examination, ultrasonography, anesthesia

ÖZ

Amaç: Pilonidal sinüs (PS), sıklıkla sakrokoksigeal bölgede görülen ve fizik muayenenin (FM) temel tanı yöntemi olduğu bir hastalıktır. Ultrasonografi (USG) gibi görüntüleme yöntemleri bazı PS değerlendirilmesinde gerekli olabilmektedir. Bu çalışmanın amacı PS için yapılan yüzeysel USG'yi değerlendirmektir.

Yöntem: Ocak 2012 ile Aralık 2013 tarihleri arasında PS nedeni ile başvuran ve preoperatif yüzeysel USG yapılan hastalar geriye dönük değerlendirildi. Yaş, cinsiyet, vücut kitle indeksi (VKİ), şikayetlerinin süresi, anal girimde uzaklığı, aktif ve inaktif sinüs orifis sayısı, anestezi şekli, PS'nin FM, USG ve patoloji piyesindeki (PP) boyutları, üst ve alt sınıra olan uzaklıkları değerlendirildi. İstatistiksel analiz için T-test and Pearson korelasyon testleri kullanıldı.

Bulgular: Çalışmaya kırk hasta dahil edildi. Tüm hastalar erkek (%100), ortalama yaş 22,82±2,77 yıl, ortalama VKİ 24,96±2,352 kg/cm^2 idi. Hastaların %72,5'i lokal anestezi altında opere edildi. Spinal anestezi ile opere edilen PS hastalarının USG'deki ortalama boyutları istatistiksel olarak anlamlı yüksek saptandı (p=0,01). Boyutların ölçümündeki korelasyon; FM ile PP arasında 0,72 (iyi) (p=0,0001), USG ile PP arasında 0,51 (ılımlı iyi) (p=0,001) saptandı. Üst ve alt sınıra olan uzaklıklarındaki korelasyon; FM ile PP arasında 0,564 (iyi), USG ile PP arasında 0,368 (ılımlı) (p=0,0001, p=0,02 sırasıyla) saptandı.

Sonuç: FM PS'nin boyut ve sınırlarının saptanmasında temel ve yüksek doğruluğa sahip tanı yöntemidir. USG ölçümleri uygun anestezi tipinin belirlenmesinde yardımcı olmaktadır. Hidrojen peroksit uygulaması ile birlikte yapılan USG veya manyetik rezonans görüntüleme ileri değerlendirmede daha etkili olarak kullanılabilecek yöntemlerdir.

Anahtar Kelimeler: Pilonidal sinüs, fizik muayene, ultrasonografi, anestezi

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Introduction

Pilonidal disease (PD) is an acquired, chronical disease caused by penetration of hairs into the sacrococcygeal subcutaneous tissue and formation of foreign body reaction[1,2]. Incidence of PD is reported 26 per 100.000 population, affecting males twice as often as females and predominantly young adults of working age[3]. Prevelance of clinical PD is 4.6%, however the rate increases 8.3% with subclinic PD[4]. Gender, body mass index (BMI), family tendency, sitting habbits, depth of natal cleft, body hair density, type of hair, poor personal hygiene and excessive sweating are the most common risk factors for PD[5,6]. Treatment of PD is vary from conservative treatment such as phenol application to fasciocutaneous rotation flap according to size of sinus, extention of fistula tract and clinical experience of surgeons[7,8,9,10]. Physical examination is basic and the most important diagnostic modality for PD. Deep natal cleft or fistula tract which is abnormal located or adjacent to anus may require further imaging methods for deciding the surgical treatment of PD. Ultrasonography (USG) is an easy accessible and applicable, inexpensive and non-invasive imaging modality that can be used for further assesment of subcutaneous tissue so as PD. The aim of this study is to reveal the effect of preoperative superficial ultrasonography for evaluation the dimensions and borders of PD.

Materials and Methods

The ethical approval was obtained from Gülhane Military Medical Academy Ethics Committee with 15 December 2015 date and 490 page number. 40 operated PD patients who performed preoperative superficial ultrasonography from January 2012 to December 2013 were evaluated retrospectively. Age, sex, BMI, duration of compliant, distance from anal verge, number of inactive or active sinus orifice, type of anesthesia and dimensions (length x width) and borders (distance from proximal and distal borders from sinus orifices) of PD by physical examination (PE), preoperative superficial USG and postoperative exploration (EXP) of specimens were compared. The informed patient consent was not obtained because the study was retrospective.

Statistical Analysis

All statistical analysis were performed by a statistical software package (SPSS 16.0). Numerical data were expressed as mean and standard derivation unless otherwise stated. Statistical significance of age, BMI, duration of compliant, distance from anal verge, number of inactive or active sinus orifices and type of anesthesia was assessed by using t-test. Correlations between PE, superficial ultrasonogarphy and EXP were assessed by Pearson's correlation (PC). According to numerical values PC was classified as poor (0-0.25), fair-moderate (0.25-0.50), good (0.50-0.75) or very good (0.75-1.00). Results were expressed with a confidence interval of 95% and the p values below 0.05 were considered statistically significant.

Results

Forty patients were included to study who have operated for PD and performed preoperative superficial USG. Superficial USG image is shown at Figure 1. All patients were male (100%), mean age was 22.82±2.77, mean of BMI was 24.96±2.352 and mean of duration of compliant was 16.22±13.02 month. Mean of distance from anal verge was 8.90±1.692 cm (6-13 cm). 57.5% of patients had one, 20% had three and 17.5% had two inactive orifices (mean; 1.62±0.925) but only 20% of patients had active sinus orifice (mean; 0.2±0.405). 27.5% (n=11) of the patients operated under spinal anesthesia, 72.5% (n=29) operated under local anesteshia. Mean amount of local anesthesia was 6.76±2.047 (4-11). Mean dimensions of PD at local anesteshia group was 344.827±220.528, at spinal anesthesia group was 422.727±282.279 but not statistically

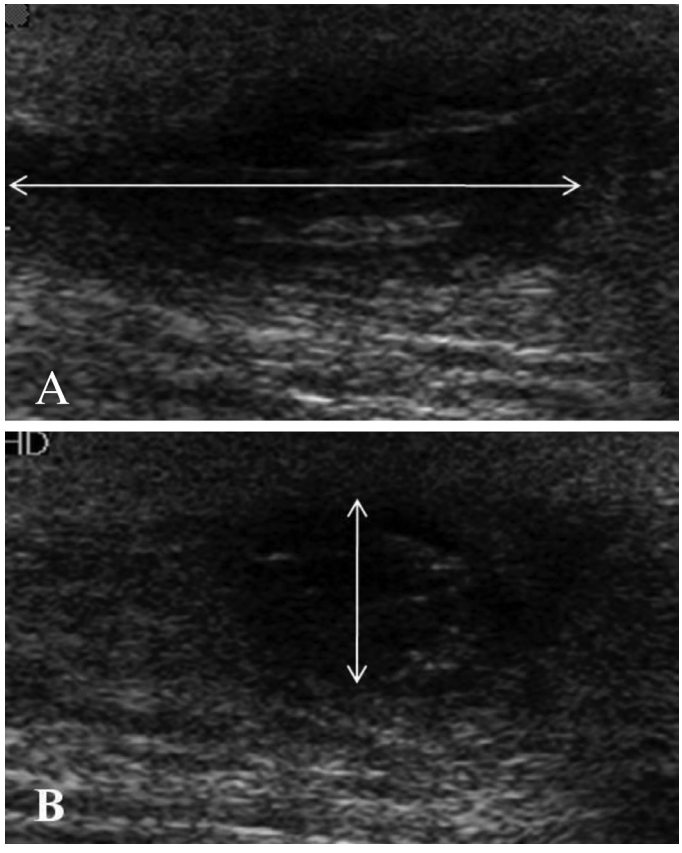

Figure 1. Superficial ultrasonography image of pilonidal disease. A) longitudinal ultrasonographic image of pilonidal cyst, B) vertical ultrasonographic image of pilonidal cyst

significant (p=0.507) in PE. Mean dimensions of PD at local anesteshia group was 218.572±131.331, at spinal anesthesia group was 304.580±265.720 and statistically significant (p=0.01) in USG (Table 1). Correlations between PE, USG and EXP are shown at Table 2. Mean of PD dimensions were measured as 366.25±237.88 mm^2 for PE, 242±178.88 mm^2 for USG and 500.87±339.68 mm^2 for EXP. Correlation of PE with EXP was found as 0.72 (good) and statistically significant (p=0.0001). Correlation of USG with EXP was found as 0.51 (moderate-good) and statistically significant (p=0.001). Mean of PD distal borders were measured as 10.00±6.097 mm for PE, 9.48±4.80 mm for USG and 10.12±6.15 mm for EXP. Correlation of PE with EXP was found as 0.564 (good) and statistically significant (p=0.0001). Correlation of USG with EXP was found as -0.019 (negative correlation) and statistically not significant (p=0.9). Mean of PD proximal borders were measured as 12.12±5.417 mm for PE, 9.69±6.78 mm for USG and 13.62±6.98 for EXP. Correlation of PE with EXP was found as 0.368 (good) and statistically significant (p=0.02). Correlation of USG with EXP was found as 0.186 (poor) and statistically not significant (p=0.25).

Discussion

PD is one of the major disease leading to loss of labor at young adults of working age. PD surgical treatments performed under local or spinal anesthesia generally. Local anesthesia has many advantages from spinal anesthesia such as short duration of hospital stay, early return to work, lack of spinal anesthesia complications. Dimensions, borders, previous operations and distance from anal region are the main determinants for desicion of anesthesia and surgery type. It is hard to measure the PD tissue dimensions and endpoints of PD exactly because of deep natal cleft or higher BMI or extention of PD to anal region without an external orifis. So that further imaging methods such as superficial USG is required to decide to surgery/anesthesia type.

Limited literatures were reported about imaging of PD such as endoanal USG or magnetic resonance imaging (MRI) were performed for fistula ano in PD. Superficial USG was performed for evaluation of dimensions, borders and branchs in sacrococcygeal or non-scarococcygeal PD.[11,12,13,14,15,16] Solivetti et al.[14] reported that high frequency probes used for diagnostic USG is useful for the anatomical definition of this PD, as well as to enable appropriate surgical treatment. Imanishi et al.[15] reported USG increases the diagnostic accuracy and determining the extent of surgery required for non-sacrococcygeal PD which occurs at low subcutaneous thickness area such as interdigittal region. Mentes et al.[16] were found the borders of PD tissue similar in 76.6% patients at PE and USG but USG detected branches or borders that distinctly exceeded the planned incision or surgery in 23.3% patients. In recent study; the correlation between PE and EXP was superior than preoperative USG and EXP or PE and preoperative USG [0.72 (good), 0.51 (moderate-good), 0.33 (moderate) respectively] for dimensions. Both correlations were statistically significant (p=0.0001, p=0.001, p=0.034 respectively). Dimensions can not be strictly detect in USG because of PD or neighbour tissue echogenity (inflammation or abcess) and anatomy of natal cleft, but application such as hydrogen peroxide can help to view the real dimensions and extention.

PE was correlated with EXP to detection distal and proximal borders [0.564 (good), 0.368 (moderate) respectively] and these were statistically significant (p=0.0001, p=0.02 respectively). USG was negative correlated with EXP to detection distal border (-0.019, p=0.9) and poor but not statistically significant correlated to detection proximal borders (0.186, p=0.25). Superior region of natal cleft has deep subcutaneous tissue underlying sacrum. Inferior region of natal cleft is adjecent with anal verge and perianal region with internal and external sphincteric muscle which have deep extention. Timely occured palpation sense

Table 1. Dimensions of pilonidal disease due to type of anesthesia (mean ± standard deviation)

	Local anesthesia (n=29)	Spinal anesthesia (n=11)	p
Physical examination	344.827±220.528	422.727±282.279	0.507
Superficial ultrasonography	218.572±131.331	304.580±265.720	0.01

Table 2. Correlation between postoperative exploration and physical examination/superficial ultrasonography

	Dimension		Distal border		Proximal border	
	PC	p	PC	p	PC	p
Physical examination	0.72	0.0001	0.564	0.0001	0.368	0.02
Superficial ultrasonography	0.51	0.001	-0.019	0.9	0.186	0.25

PC: Pearson's correlation

experience of surgeons and the experience of radiologist are the other factors for evaluation natal cleft and perianal region strictly.

Physcial examination was not affect the desicion of anesthesia type statistically (p=0.507) but USG was affect the desicion of anesthesia type statistically (p=0.01) which is clinically insignificant. Mentes et al.[16] reported that USG changes the planned surgery desicion in 23.3% patients.

In conclusion; PE is basic and a high accuracy diagnostic modality for detecting dimensions and borders of PD. Larger dimensions PDs which detected at USG can be operated with spinal anesthesia. Additional applications for USG which can increase the accuracy (make visible) such as hydrogen peroxide or MRI can be performed for detection dimensions and borders of PD.

Ethics

Ethics Committee Approval: Retrospective study.

Informed Consent: Retrospective study.

Peer-review: External and internal peer-reviewed.

Financial Disclosure: The author approved that there is no conflict of interest.

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