

Nigerian Journal of Clinical Practice  
June 2009 Vol.12(2) :157-161

## RELATIONS OF THE NECK OF GROIN HERNIAS TO PUBIC TUBERCLE

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### ABSTRACT

**Objective:** The traditional anatomical and surgical teaching is that any hernia with the neck above and medial to the pubic tubercle are inguinal. Present day surgical authors and teachers mostly adhere to this teaching but observe a difference in this relationship in clinical demonstrations. This confuses most medical students and surgical residents. This all-important clinical teaching should hence be revisited. Hence this study was to ascertain and validate clinically the true relationship of pubic tubercle and the neck of groins hernia.

### Method:

**Design:** A prospective observational study.

**Setting:** Surgical Outpatient Clinic of Wesley Guild Hospital, Ilesa Unit of the Obafemi Awolowo University Teaching Hospital Complex, Nigeria.

**Subjects and Measurements:** Consecutive patients seen in the clinic with uncomplicated groin hernias were studied from January 1993 to December 2004. Examinations were done to ascertain the relationship of the groin hernias to the pubic tubercle.

**Results:** 96.8% of inguinal hernias have their necks above and lateral to pubic tubercle while all femoral hernia had their necks below and lateral to the pubic tubercle.

**Conclusion:** Location above or below the pubic tubercle should be used as the sole difference between femoral and inguinal hernias in clinical demonstrations. More observations and inguinal dissections will be necessary for further clarification.

**Key Words:** Groin hernia. Neck of hernia sac. pubic tubercle

(Accepted 7 April 2008)

### INTRODUCTION

Inguinal herniorrhaphy is the most frequently performed abdominal operation, accounting for 10-15% of operations in general surgery<sup>1-4</sup>. It may be higher in developing African countries such as Nigeria, as the incidence of inguinal hernia has been found to be threefold in black communities as compared to the rate in caucasians<sup>5-7</sup>. Approximately 96% of groin hernias are inguinal and 4% are femoral. Inguinal hernias are bilateral in as many as 20% of affected adults. While inguinal hernia occur fairly equally across adult age group, the femoral hernias tend to occur more often in elderly women. The lifetime risk of inguinal hernia is approximately 10percent<sup>8</sup>. The groin, one of the naturally weak areas of the abdominal wall is the most common site for abdominal hernias<sup>9</sup>. These usually occur through either the inguinal or femoral canal, giving rise to inguinal and femoral hernias respectively. The inguinal canal and its openings lie above the inguinal ligament while the femoral canal lies below it<sup>10, 11</sup>. The internal and external rings form the ends of the

inguinal canal. Inguinal hernias are divided into indirect and direct. Indirect hernias enter the canal from the internal ring and may or may not exist at the external ring depending on whether it is bubunocele, furnicular or inguinoscrotal. The direct hernias pass through the hesselbach's triangle in the posterior wall of the canal. This triangle is located lateral to the external ring. The internal ring, an opening in the transversalis fascia, lies 2.5cm above the midpoint between the pubic tubercle (PT), and the anterior superior iliac spine<sup>10, 12, 13</sup>. There are lots of conflicting statements as regard the location of external ring. Some authors of anatomy and surgical textbooks agree that the external ring through which most inguinal hernias eventually exit from the canal lies above the PT<sup>11-14</sup>. Harold Ellis<sup>12</sup> and Parks et al<sup>13</sup> state that the external ring lies above and medial to the PT. However, Knol et al<sup>15</sup> asserted that the external ring is a triangular opening in the external oblique aponeurosis with its apex superiorly and lateral to the pubic tubercle. The neck of the sac is generally regarded as the part through which the viscus enters into the sac. This is usually located at the internal ring. Clinically, what is regarded as the neck is the first

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point of rise of the hernia sac under the covering abdominal wall following Valsalva maneuvers or definitive cough impulses. Bennet et al<sup>10</sup> and Clain<sup>16</sup>, affirmed that most groin hernias whose neck of sac lie above and medial to the PT are inguinal while those below and lateral to the PT are femoral. Darko et al<sup>17</sup> relate the sac neck to the inguinal ligament and PT with no mention of the medial or lateral relationship. Ford and Cumming<sup>18</sup> states that inguinal hernia emerged from the abdominal wall through the external inguinal ring and is palpable above and medial to the PT while femoral hernia was palpable below and lateral to the PT. Whether the neck is regarded to be at the internal ring, inguinal canal or external ring, clinical findings has negated the assertion of most surgical and anatomy text Hair et al<sup>19</sup> had documented the conflict between the clinical findings and the assertions of many anatomical and surgical authors. As a result of these conflicting and confusing assertions, teaching and clinical demonstration of groin hernias to medical students and surgical residents in most Nigerian Teaching Hospitals and even developed centers have always generated much controversy<sup>19</sup>.

This prospective study conducted at Obafemi Awolowo University Hospital Teaching Complex (O.A.U.T.H.C), Wesley Guild Hospital, Ilesa, Nigeria is therefore aimed at ascertaining the anatomical relationship of the PT to the neck of groin hernias.

#### PATIENTS AND METHOD

Obafemi Awolowo University Hospital Teaching Complex (O.A.U.T.H.C), Wesley Guild Hospital unit, Ilesa, is located in the southwest geo-political zone of Nigeria. All adult patients presenting in the general surgical outpatient clinics from January 1993 to December 2004 with groin hernias were prospectively studied. Those with strangulated or obstructed hernia were excluded. The sociodemographic data of each patient was recorded in a standard proforma after an informed consent had been taken. Each patient was then examined standing and or lying supine by the consultant surgeon and the unit senior registrars. At least two senior registrars or a senior registrar and a consultant did the examination. Clinical photograph was also taken for some of the patients. This was done to remove the interpersonal errors. The site of the groin swelling was demonstrated by visible or palpable cough impulse. Valsalva maneuver to increase intra-abdominal pressure sometimes aided the demonstration of the hernia<sup>13</sup>. The Pubic tubercle (PT) was subsequently located by running the finger along the linea alba in the midline of the lower abdomen to the pubic symphysis and tracing laterally

to the PT, or by palpating along the tendon of the adductor longus muscle to its attachment to the pubic bone just below the PT. The type of groin hernia as well as the subtype of inguinal hernia in each case was determined and the relation of the neck of the hernia to the PT was equally noted. The neck of the hernia was defined as the first point of rise of the hernia sac under the covering abdominal wall. All the diagnoses were also confirmed at operation. Those with variation at surgery were reclassified as appropriate. The findings in each patient were recorded and the results were analyzed using SPSS version 11.0. Univariate analysis was carried out to determine the selected socioeconomic characteristics as well as the type and site of the hernia.

#### RESULTS

Within the study period, a total of 565 patients were seen. 529 patients (88.9%) had unilateral groin hernias while 36 (11.1%) had bilateral groin hernias giving a total of 601 hernias. 512 patients (90.6%) were males and 53 (9.4%) were females. The age range was 17-96 years with a median of 58.00 years. More hernias, 385 (64.1%) were found in the right groin than the left that had 216 (35.9%) hernias. Five hundred and eighty (96.5%) of all groin hernias were inguinal, while 21 (3.5%) were femoral. The inguinal hernias were made up of 443 (76.4%) indirect, 124 (21.4%) direct, and 13 (2.2%) cases of pantaloon hernias. Clinically, 152 (26.2%) of the inguinal hernias were bubonocoeles, 323 (55.7%) were funicular while 105 (18.1%) were inguinoscrotal hernias. (Table 1) The relations of the necks of the hernias to the pubic tubercle were also studied. The necks of all the femoral hernias were inferolateral to the PT. Of the inguinal hernias, 498 (85.9%) had the neck superolateral to the PT. Only 82 (14.1%) were superomedial to the P.T. (figure 1-4). The fingers and the forceps shown in the pictures are used to identify the pubic tubercle.

Table 1: Site, Type and Nature of Groin Hernia

Variables	Frequency	Percentage
Site Right	385	64.1
Left	216	35.9
Type Inguinal	580	96.5
Femoral	21	3.5
Nature Bubunocoele	152	25.3
Funicular	323	53.7
Inguinoscrotal	105	17.5
Femoral	21	3.5
<b>Total</b>	<b>601</b>	<b>100.0</b>

**Picture1:Finger on Pubic Tubercle and neck of Hernia and Lateral to Pubic Tubercle.**



**Picture 2:Forceps Pointing to the Pubic Tubercle**



**Picture3: Neck of Hernia is above the Pubic Tubercle shown by Finger.**



**Picture 4: Bubonecele showing Neck of Hernia Above and Lateral to Pubic Tubercle.**



## DISCUSSION

Pubic tubercle is an important reference point in groin hernia. It has been used widely in clinical diagnoses and computerized tomography diagnoses of groin hernias<sup>20,21</sup>. In this study, we found that of 580 inguinal hernias seen, 4988 (85.9%) hernias have the neck above and lateral to PT, while only 82 (14.1%) was above and medial. This finding is at variance with what most authors of surgical textbooks assert<sup>10, 13, 16-18, 22, 23</sup>. Darko R.<sup>17</sup> however differentiated between inguinal and femoral hernias clinically by relating the neck of the hernia to above or below PT only. Generally it is known that in indirect (oblique) inguinal hernias, the neck of the sac lies about the deep inguinal ring<sup>11, 13, 22, 23</sup>. Therefore in virgin inguinal canals, hernias whose sacs initially came through the internal rings either congenital or acquired would have their neck obviously lying at or near this ring. As this ring is located above and lateral to the PT, necks of most indirect inguinal hernias would undoubtedly be found above and lateral to this Pt<sup>19</sup>. In bubonecele (hernia that is still limited to the inguinal canal, funicular hernia (just outside the external ring, and even indirect complete (oblique inguino-scrotal or inguino-labial), the neck should be expected to be at the internal ring<sup>11, 13</sup>. The funicular direct type of inguinal hernia, which occurs through the Hasselbach's triangle' is still within the inguinal canal<sup>2</sup>. All these can explain why in this study most of the inguinal hernia necks were found above and lateral to the pubic tubercle. The necks of the groin hernia become more strategic when a distinction is to be made between upturned femoral hernia and inguinal hernia particularly if the patient is obese. In some instances femoral hernia has emerged through the cribiform fascia at the fossa ovalis, the fundus pushes forward then turns upwards to lie over and anterior to the inguinal ligament<sup>14</sup>. The dilemma can be resolved by observing the neck that is the first point of rise of the hernia sac under the covering abdominal wall. This is well appreciated if Valsava maneuver is used to demonstrate a reducible hernia<sup>1</sup>. This observation may however be difficult in wide necked hernia particularly direct inguinal types with defects in the posterior wall of the canal. Where a truss has been worn for a long time by the patient, the tissues may have been so matted and crushed out with muscles converted to fibrous tissues that the position of the neck could have been displaced<sup>20</sup>. We found this in a few patients whose conjoined tendons or muscle were so frayed out that the hernia neck was found above and medial to the pubic tubercle. This type of hernia however accounted for only 14.1% of inguinal hernias studied. In chronic funicular or inguinoscrotal hernias, the progressive stretching of the canal walls with its external rings may allow for wide protrusion and consequent displacement of the external ring to

more medial position. This was our experience in some of the patients who had open groin herniorrhaphy. The unanswered question is whether it is the entire bulge of the hernia or the neck of the sac alone that should be used to assess the relationship to the pubic tubercle. In as much as there is need for clinical distinction between femoral and inguinal hernias, and the different sizes of hernias, the authors suggest that surgeons should stick to the neck of hernia. Since all groins hernias whose neck are above PT and inguinal ligament are inguinal, and those below are femoral, the authors would suggest that for the purpose of clarity, surgeons should use relation above or below the PT as a reference point to neck of hernia. Alternative suggestion might be to ask the students to place their finger over the femoral canal for reducible hernias and then ask the patient to cough. This landmark is easily felt either by following the adductor longus tendon to below the inguinal ligament and then placing ones fingers anterior and lateral to the tendon or alternatively palpating the femoral artery and placing ones hand approximately a finger breath medial to it. When the patients cough the femoral hernia should remain reduced while an inguinal hernia will appear as an obvious swelling<sup>19</sup>. Furthermore, formal dissection can be carried out in paediatric and adult cadavers to further redefine anatomical relationship of the PT and the external inguinal ring

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