INTRODUCTION

The sella turcica in the sphenoid bone consists of a central hypophysial fossa and two pair of clinoid processes (anterior and posterior). Those processes are connected by a horizontal fold of dura mater described as interclinoid dural fold (Ozdogmus et al., 2003), interclinoid ligament (Ozdogmus et al.; Archana et al., 2010; Suazo-Galdames et al., 2008), fibrous ligament (Cedeberg et al., 2003) or diaphragma sellae (Butler, 2006) that margins superiorly the sella turcica like an incomplete dural roof (Butler), separating it from the suprasellar subaracnoid space (Castrioti-Scandenberg, 2005) and, sometimes, is the back-ground of partial or complete ossification (Archana et al.; Suazo-Galdames et al.; Skrzat et al., 2006), with the conformation of an osseous structure like a bony bar or thick bony trabecula (Skrzat et al.), and the appearance of a separate enclosed pituitary fossa (Kantor & Norton, 1987) with a foramina below named common interclinoid foramen (Archana et al., 2010). That osseous structure has been termed differently in the literature: interclinoid taenia (Ozdogmus et al.), iaenia interclinoidea (Lang, 2001), interclinoid bars (Archana et al.; Skrzat et al.), interclinoid osseous bridge (Ertuk et al., 2004), sella turcica bridge/bridging (Jones et al., 2005; Archana et al.; Leonardi et al., 2006; Leonardi et al., 2009; Leonardi et al., 2011; Meyer-Marcotty et al., 2010), sella bridge (Peker et al., 2006), roofing/bulging/calcification of the diaphragma sellae (Kantor & Norton; Leonardi et al., 2009; Leonardi et al., 2011; Leonardi et al., 2006), Calciﬁed/ossiﬁed interclinoid ligament (Cedeberg et al.; Ozdogmus et al.; Skrzat et al.), and Bridged sella (Cedeberg et al.; Tetradis & Kantor, 1999).

The only way of diagnosing any calcification of the sella turcica is with a lateral skull – cephalometric radiography (Leonardi et al., 2011). The sella turcica bridge (STB) is the true bony union of the anterior and posterior clinoid processes (Leonardi et al., 2011); the clinoid
enlargement (CLEN), is the overlapping (a projectional artifact) of the anterior and posterior clinoid processes (Axelsson et al., 2004; Becktor et al., 2000) and not necessarily real bony fusion (Becktor et al.). But a clear distinction between sella turcica bridge (STB) and clinoid enlargement (CLEN) on lateral radiographs is difficult to determine (Axelsson et al.; Leonardi et al.).

The purpose for the present study was to determine the frequency of sella turcica bridge and clinoid enlargement in lateral cephalometric radiography from Peruvians, identify any possible sex difference and age group associations and compare our findings with similar studies in the scientific literature.

MATERIAL AND METHOD

Conventional (plain film) lateral cephalometric radiography of 463 Peruvians patients from Lima – Perú who attended our radiology center (CIDDENT) between January – May 2011 were evaluated to determine the presence of sella turcica bridge (STB) and clinoid enlargement (CLEN). To obtain data from a normal population, lateral cephalometric radiography from any cleft palate patients, craneofacial syndromes, and poor quality image were excluded from the present study.

The sella turcica region was reviewed by a maxillofacial radiologist (IEPL) and the findings were classified as follows:

a. Sella turcica bridge (STB), presence of a continuous bony bar between anterior and posterior clinoid processes with a delimited round cavity below and the appearance of a separate enclosed hypophysial fossa (Kantor & Norton,). (Fig. 1).

b. Clinoid enlargement (CLEN), anterior or posterior clinoid processes enlargement that surpasses the Sella (S) cephalometric point. (Fig. 2).

c. Negative finding.

Database was grouped in MS Office Excel 97 and statistical analyses were performed on IBM SPSS Statistics 15. The statistical comparisons included Cramer’s V statistics and ETA statistics to evaluate the association degree between STB and CLEN with sex and age groups (under 18 and over 18) variables. The significance level was set at p<0.05.

To determine intraexaminer agreement in the identification of sella turcica bridge or pseudobridging, 100 lateral cephalometric radiographs were re-evaluated by the maxillofacial radiologist two weeks after the initial analysis; Kappa coefficient value was 0.889 which means a substantial strength of agreement (Sim & Wright, 2005).

RESULTS

From the initial population study (463 lateral cephalometric radiography), forty six were excluded because they met the exclusion criteria described above. After all, 417 lateral cephalometric radiography were able to be evaluated.

Of the 417 radiography, 239 were from females and 178 from males. The age range was 5 - 53 years with a mean value of 14.73 +/- 7.83; 15.03 +/- 8.45 for females and 14.32 +/- 6.92 for males.

The STB frequency was 4.3% (1.91% in females, 2.39% in males, 2.63% in the 5 to 18 years group and 1.67% in the 19+ years group), and the CLEN frequency was 16.3% (13.31% in females, 5.99% in males, 12.7% in the 5 to 18 years group and 3.6% in the 19+ years group). Cramer’s V
statistics and ETA statistics association indexes were calculated to test whether the distribution of STB and CLEN were statistically significant associated to sex and age groups, the results were not significant (p > 0.05). (Tables I, II).

Table I. Distribution of STB and CLEN according to sex.

<table>
<thead>
<tr>
<th>Sex</th>
<th>No finding (%)</th>
<th>Bridge (%)</th>
<th>CLEN (%)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>188 (45.08)</td>
<td>8 (1.91)</td>
<td>43 (10.31)</td>
<td>239</td>
</tr>
<tr>
<td>Male</td>
<td>143 (34.29)</td>
<td>10 (2.39)</td>
<td>25 (5.99)</td>
<td>178</td>
</tr>
<tr>
<td>Total</td>
<td>331</td>
<td>18</td>
<td>68</td>
<td>417</td>
</tr>
</tbody>
</table>

Cramer’s V statistics value = 0.073 (p>0.05)

Table II. Distribution of STB and CLEN according to age groups.

<table>
<thead>
<tr>
<th>Age groups</th>
<th>No finding (%)</th>
<th>Bridge (%)</th>
<th>CLEN (%)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 to 18 y (mean)</td>
<td>279(66.9)</td>
<td>11(2.63)</td>
<td>53(12.7)</td>
<td>343</td>
</tr>
<tr>
<td>19+ (mean)</td>
<td>52(12.47)</td>
<td>7(1.67)</td>
<td>15(3.6)</td>
<td>74</td>
</tr>
<tr>
<td>Total</td>
<td>331</td>
<td>18</td>
<td>68</td>
<td>417</td>
</tr>
</tbody>
</table>

Eta statistics value=0.110* (p>0.05)

DISCUSSION

The radiographic diagnosis of STB and CLEN was made according to the criteria found in the literature (Kantor & Norton; Meyer-Marcotty; Becktor et al., 2000). For CLEN an extra criterion was set: the relationship between the enlarged clinoid process tip with the sella cephalometric point (S), which is an adequate and easy-to-find radiographic reference point; such criteria and reference point for CLEN has not been used or proposed before. Axelsson et al., used the relationship between two reference lines (sella turcica length and diameter) to diagnose CLEN; Leonardi et al. (2006, 2009 and 2011) use the same criteria. Becktor et al., diagnose CLEN if the tip of the clinoid processes extend and meet anteriorly, posteriorly or in the middle with a thinner fusion. Cedeberg et al., quantified the extent of ligamentous calcification in less than a half and more than a half calcification. Jones et al., use the interclinoid distance to diagnose CLEN.

Cephalometric radiography and tracings are used in orthodontics to evaluate the craniofacial and dental structures, but they also include other diagnostics information about the skull, face, and upper cervical spine (Leonardi et al., 2009; Leonardi et al., 2006), and various occult pathologies and rare normal variants involving the head or spine have been reported thanks to this information (Leonardi et al., 2009). Plain film radiography have a relatively high sensitivity for detecting sella change at between 67% and 77% of positive findings (Jones et al.,); and the lateral cephalometric radiography may give initial evidence of pathology in the sella turcica region (Meyer-Marcotty). The sella turcica is an area of the skull commonly viewed by orthodontists during radiographic interpretation prior to cephalometric analysis (Cedeberg et al.).

The STB frequency found in our study was 4.31% (3.3% females and 5.6% males), and the CLEN frequency was 13.6% (17.9% females and 14% males); with no statistical differences between sex and age groups. The STB and CLEN frequencies found in the present study are similar to those found by Bektor et al., STB frequency of 5.6% and CLEN frequency of 13%; Axelson et al., STB frequency of 5.6% (6% in males and 16% in females); and Cederberg et al., STB frequency of 8.2% and CLEN frequency of 38.4%, the CLEN frequency found in the present study is markedly lower. Jones et al., found a STB frequency of 6.68% and 4.64% in two different groups of patients (combined surgical-orthodontical correction, and orthodontic correction only), and a CLEN frequency of 10.02% and 2.65% too, with statistically significant differences between the two groups, our findings are similar but the inclusion

RESUMEN: El propósito del estudio fue determinar la frecuencia de puente selar y alargamiento clinoídeo en radiografías laterales cefalométricas de pacientes peruanos que asistieron a nuestro centro radiográfico entre enero a mayo del 2011 e identificar posibles asociaciones de sexo ó edad. El área de la silla turca de 417 radiografías cefalométricas laterales fue evaluada para determinar la presencia de puente selar (fusión entre los procesos clínoideos) o alargamiento de los procesos clínoideos anterior o posterior en relación con el punto cefalométrico Sella (S). La frecuencia de puente selar fue de 4.31% (n=18), la frecuencia de alargamiento clinoídeo fue de 16.3% (n=68). Los análisis estadísticos de Kramer y ETA no encontraron asociación significativa entre el sexo y la edad (p>0.05). El puente selar y el alargamiento clinoídeo no son hallazgos radiográficos tan infrecuentes en la población estudiada; nuestros resultados son similares a los encontrados en la literatura. La presencia del puente selar y alargamiento clinoídeo debe tenerse en cuenta como una anomalía estructural que puede influir en el pronóstico de los procedimientos quirúrgicos en la zona de la silla turca.

PALABRAS CLAVE: Silla turca; Radiología; patología; Osificación heterotópica; Calcinosis.
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