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= Abstract =

Combined Injuries of Pubic Ramus Fracture - The Role of Computerized Tomography -

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Pelvic fractures in general can be divided into two major types, based on the amount of energy involved : low-energy mechanisms are usually fractures of individual bones of the pelvic ring and high-energy mechanisms results in more severe injury to the pelvic ring, generally producing pelvic ring disruption. Pelvic fractures resulting from low-energy mechanism are usually fractures of individual bones of the pelvic ring that do not damage the true integrity of the ring structure. These include avulsion fractures, isolated fractures of the sacrum, and iliac wing fracture.

Computerized tomography permits confirmation of findings noted on plain film and delineates injury to the posterior ring. It facilitates subclassifying the fracture according to degree of severity, as in the Young classification.

The purpose of this study is to evaluate the role of CT, which is to identify the combined

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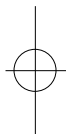
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injuries of pubic ramus fractures. The sacrum impacted fracture and sacroiliac joint injury are often unidentified and diagnosed as an isolated fracture to the pubic ramus.

The 42 cases of pubic ramus fractures on conventional radiography were simultaneously performed CT from June 1996 to February 1998. The results of associated injuries were as follows.

1. In 34 cases (81%) posterior pelvic ring injuries (sacral fractures 28 cases, anterior sacroiliac joint widening 6 cases) were observed.
2. CT was very useful to diagnose the posterior pelvic injury and to determine the mechanisms of injury.

Key Words : Pubic ramus fracture, Computerized tomography.

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Table 1. Case of age and sex distribution

Age / Sex	No. of patient			%
	Male	Female	Total	
- 10	2	0	2	5
11 - 20	2	3	5	12
21 - 30	4	6	10	24
31 - 40	3	1	4	10
41 - 50	4	3	7	17
51 - 60	2	4	6	14
61 - 70	1	2	3	7
71 -	1	4	5	11
Total	19	23	42	100

1,5,6,8),

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Table 2. Etiology of injury

History	No. of patient			%
	Male	Female	Total	
Traffic accident	16	19	35	83
Fall down	3	3	6	14
Slip down	0	1	1	3
Total	19	23	42	100

Table 5. Ramus fracture findings on plain radiography and CT

Diagnosis	No. of patient	
	Transverse fracture	Longitudinal fracture
L.C. injury type I	27	1
A.P.C. injury type I	0	6
Isolated Ramus fracture	7	1
Total	34	8

* L.C. : Lateral compression

* A.P.C. : Anteroposterior compression

Table 3. Combined pelvic injury according to ramus fracture site

	Ramus fracture	No. of patient	%
Linear or impacted sacral fracture	Ipsilateral	13	38
	Contralateral	5	15
	Bilateral	8	24
Displaced sacral fracture	Ipsilateral	2	5
Anterior sacroiliac joint injury	Ipsilateral	3	9
	Bilateral	3	9
Total		34	100

Table 4. Injury classification according to the Young System

Diagnosis	No. of patient			%
	Male	Female	Total	
L.C. injury type I	14	14	28	67
A.P.C. injury type I	2	4	6	14
Isolated Ramus fracture	3	5	8	19
Total	19	23	42	100

* L.C. : Lateral compression

* A.P.C. : Anteroposterior compression

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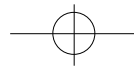
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CT	42	34
(81%)		
(19%)	34	28
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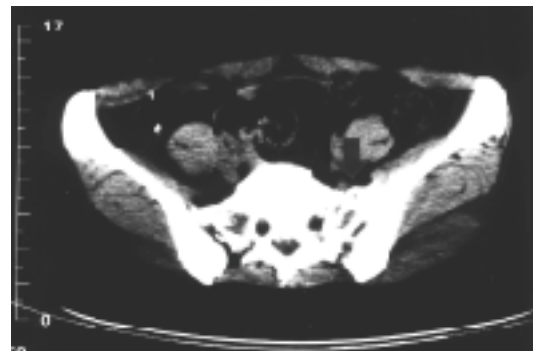


Fig 1-A. Pelvis anteroposterior radiograph shows left inferior ramus transverse fracture, but no definite fracture in sacrum.

B. CT shows a impacted fracture of left sacrum (L.C. I).

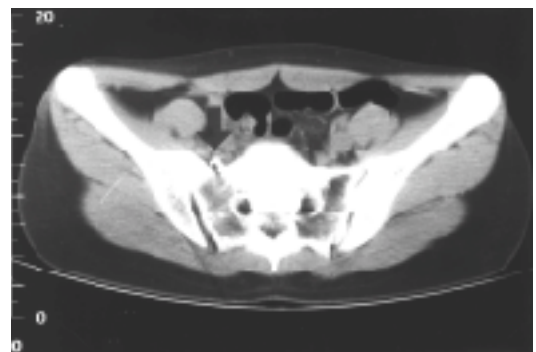
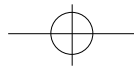


Fig 2-A. Pelvis anteroposterior radiograph shows right superior and inferior ramus transverse fracture.

B. CT shows a impacted fracture of right sacrum (L.C. I).





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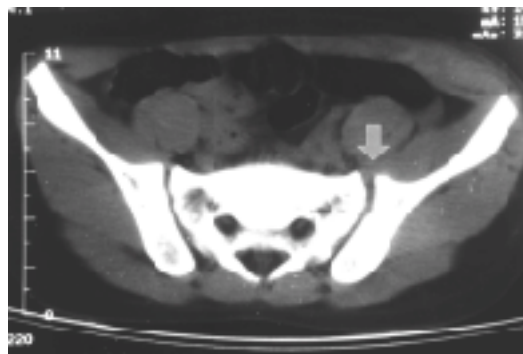


Fig 3-A. Pelvis anteroposterior radiograph shows left inferior ramus longitudinal fracture.

B. CT shows a separation of left anterior sacroiliac joint (A.P.C. I).

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(Fig 3-A). Pelvic CT

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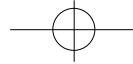
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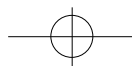
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REFERENCES

- 42 1) , , :
 , 17:485-491, 1982.
 2) , :
 , 20:460-469,
 CT , 28 , 1985.
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 , 34 Young²²⁾ 4) :
 1 28 (67%) , 20:177-
 1 6 (14%) 181, 1984.
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- , 16:889-895, 1981.
- 6) , :
18:1005-1012, 1983.
- 7) , :
22:249-253, 1986.
- 8) , :
17:643-648, 1982.
- 9) **Burgess AR, Eastridge BJ and Young JWR** : Pelvic Ring Disruptions: Effective Classification System and Treatment Protocols. *J Trauma*, 30:848-856, 1990.
- 10) **Charles A, Rockwood Jr, David P and Green** : Fractures of the Pelvis. In *Rockwood, Fractures in Adults*, 2nd ed. 1094, Philadelphia, J.B. Lippincott G., 1984.
- 11) **Fountain SS, Hamilton RD and Jameson RR** : Transverse Fractures of the Sacrum. *J Bone Joint Surg*, 59A:486-489, 1977.
- 12) **Gill K and Bucholz RW** : The Role of Computerized Tomographic Scanning in the Evaluation of Major Pelvic Fractures. *J Bone Joint Surg*, 66A:3439, 1981.
- 13) **Griffiths HJ, Standertskijold-Nordenstam CG, Burke J, Lamont B and Kimmel J** : Computed tomography in the management of Acetabular Fractures. *Skeletal Radiol*, 11:22-31, 1984.
- 14) **Harley JD, LA and Winkquist RA** : CT of Acetabular Fractures: Comparison with Conventional Radiography. *Am J Roentgenol*, 138:413-417, 1982.
- 15) **Judet R, Judet J and Letournel E** : Fracture of the acetabulum, *J Bone Joint Surg*, 46A:1615-1646, 1964.
- 16) **Kane WJ** : Fractures of the Pelvis. In *Rockwood, C.A. Jr., and Green, D.P. : Fracture in Adults*, 2nd ed. 1093-1208. Philadelphia, J.B. Lippincott Co., 1984.
- 17) **Labbe AJL, Alberge Y, Austry P, Delcroix P and Ficat RP** : The role of Computed Tomography in the Assessment and Treatment of Acetabular Fracture. *Clin Radiol*, 36:13-18, 1985.
- 18) **Mack LA, Harley JD and Winkquist RA** : CT of Acetabular Fractures: Analysis of Fractures Patterns. *Am J Roentgenol*, 138:407-412, 1982.
- 19) **Northrop CH, Eto RT and Loop JW** : Vertical fracture of sacral ala. *Clin Orthop*, No. 124:102-106, 1975.
- 20) **Paul DF and et al.** : Computed tomography in orthopaedic surgery. *Clin Orthop*, No. 139:142, 1979.
- 21) **Sauser DD, Bilimoria PE, Rouse GA and Mudge K** : CT Evaluation of Hip Trauma. *Am J Roentgenol*, 135:269-274, 1980.
- 22) **Young JWR, Burgess AR, Brumback RJ and Poka A** : Lateral Compression Fractures of the Pelvic: The Importance of Plain Radiographs in the Diagnosis and Surgical Management. *Skeletal Radiol*, 15:103-109, 1986.