

GLOBAL JOURNAL

OF MEDICAL RESEARCH: I

Surgeries and Cardiovascular System

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Highlights

Sympathetic Nervous System

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Discovering Thoughts, Inventing Future

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Interaction of Inflammatory Response and Sympathetic Nervous System in the Central Regulation of Chronic Heart Failure in Rats

By Fang Liu, Wenxiu Zhou & Jinjun Li

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Abstract- Objective: To investigate the interaction between immune inflammatory response and sympathetic nervous system in the central regulation of chronic heart failure in rats.

Methods: Branch ligation of the left anterior descending the making rat model of chronic heart failure, by AT1 receptor blockade losartan central intervention, intravenous injection of six Ting quaternary amines detected in rat basal sympathetic activity level, supersonic and enchanted figure for the detection of cardiac function, ELISA method for detection of plasma catecholamine and inflammatory factor levels.

Results: Compared with the sham operation group, markedly enhanced the heart failure rat sympathetic nerve activity level, peripheral plasma TNF alpha, IL-1 beta and NE levels were significantly increased ($P < 0.05$) and cardiac dysfunction ($P < 0.05$); give AT1 receptor blocker losartan intervention RAS in central nervous system after the excessive enhancement of sympathetic nerve activity levels have decreased significantly, peripheral TNF alpha, IL-1 beta and NE levels were decreased ($P < 0.05$), cardiac function increased significantly ($P < 0.05$).

Keywords: chronic heart failure, sympathetic nervous system, inflammatory cytokines.

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Interaction of Inflammatory Response and Sympathetic Nervous System in the Central Regulation of Chronic Heart Failure in Rats

Fang Liu ^α, Wenxiu Zhou ^σ & Jinjun Li ^ρ

Abstract- Objective: To investigate the interaction between immune inflammatory response and sympathetic nervous system in the central regulation of chronic heart failure in rats.

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Conclusion: Inhibition of RAS levels in the central nervous system in rats with chronic heart failure can reduce the CHF of the sympathetic system and peripheral immune response to inflammation, improve heart function.

Keywords: chronic heart failure, sympathetic nervous system, inflammatory cytokines.

I. INTRODUCTION

Immune inflammatory response and sympathetic nervous system activation plays an important role in the occurrence and development of chronic heart failure (CHF) [1,2], But its activation mechanism and the relationship between central and peripheral levels of activation are not clear. There is evidence to show that CHF central renin angiotensin angiotensin system (RAS) over enhancement, central Pro inflammatory cytokines (PIC) increased expression, and promote the activity of the sympathetic nervous system over enhancement, but the second not mediated CHF state week immune inflammatory reaction is uncertain [3, 4]. In this study, the CHF model of myocardial ischemia was made by ligation of the left anterior descending branch of the left coronary artery, and the central and peripheral

sympathetic activity and immune inflammatory response were observed at different time points after ligation. And through the intervention of the central level of RAS, to observe whether the coronary artery ligation in rats can reduce the level of immune inflammatory reaction and sympathetic nervous system activity, and improve the cardiac function. To provide new ideas and basis for the prevention and treatment of CHF.

II. MATERIALS AND METHODS

- a) **Animals and groups:** 36 rats of SPF grade male Sprague Dawley rats (Chinese Academy of Sciences Shanghai Laboratory Animal Center, weight of 280 to 320 g, were randomly divided into 3 groups: operation group (model), sham operation group (sham) and central intervention group (int), 12 rats in each group; central intervention group and operation group underwent coronary artery ligation surgery. In the sham group only thread ligation; central intervention group after operation via mini osmotic pumps to the bilateral lateral ventricle for 6 weeks to give AT1 receptor blocker losartan losartan 0.05ug/h. All rats were provided in the same environment and diet.
- b) Coronary artery anterior descending branch ligation experimental rats given ketamine (30 mg / kg) were anesthetized by intraperitoneal injection and adequate anesthesia endotracheal intubation mechanical ventilation (ALC - V8, Shanghai Alcott Biological Technology Co., Ltd.), open chest to expose the heart, with 6 / 0 fine needle through ligating coronary artery before descending of preparing the model of myocardial ischemia, ECG monitoring suggest that limb lead R wave amplitude increased, with I and AVL lead ST segment elevation prompt model was made successfully. Rats in sham operation group were only in the same area of the anterior descending branch of the heart coronary artery but not ligation.
- c) **Echocardiography detection:** The cardiac function of rats was detected by SEQUOIA ACUSON 512 ultrasonic diagnostic apparatus: The test items included left ventricular short axis systolic rate (FS), ejection fraction (EF), systolic left ventricular posterior wall thickness (LVPWs), left ventricular end

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diastolic diameter (LVEDD), and systolic left ventricular diameter (LVIDs).

- d) *Detection of sympathetic nerve activity Based on the level of sympathetic nerve activity:* A quick jugular vein injection of nerve blocking agent six hydrocarbon quaternary amine, to the average arterial pressure (MAP) decreased, MAP decreased the greater the higher the level of the basis of sympathetic nerve activity.
- e) The levels of catecholamine and inflammatory factors were detected by double antibody sandwich ELISA method, NE, E levels and TNF-, IL-1, IL-6 levels. All operations were carried out strictly in accordance with the instructions of the kit.
- f) Statistical methods using spss16 statistical software for statistical analysis, measurement data with mean

+ standard deviation ($\bar{X} \pm S$) to express data using single factor variance analysis, the groups were compared using t test, $P < 0.05$ said there was a statistically significant difference.

III. RESULTS

- a) Echocardiographic parameters. Compared with group Sham, LVPWs, LVIDd and LVIDs were significantly increased in group Model (P mean < 0.05); FS and EF were significantly lower (P mean < 0.05). Int group compared with LVPWs group Model, LVIDd and LVIDs were both decreased (P mean < 0.05); FS and EF increased (P mean < 0.05) (Table 1)

Table 1: Weeks after type M rat heart ultra parameters ($\bar{X} \pm S$, $n=12$)

Group	LVPWs(cm)	LVIDd(cm)	LVIDs(cm)	FS(%)	EF(%)
Sham	0.22±0.02 [#]	0.60±0.05 [#]	0.44±0.10 [#]	59.47±3.17 [#]	77.45±5.71 [#]
Model	0.33±0.03 [*]	0.89±0.10 [*]	0.78±0.12 [*]	21.45±2.11 [*]	40.20±3.76 [*]
Int	0.25±0.02 ^{*#}	0.68±0.04 ^{*#}	0.49±0.11 ^{*#}	37.78±3.42 ^{*#}	49.16±3.03 ^{*#}

Note: compared with Sham group, * $P < 0.05$; compared with Model group, # $P < 0.05$.

- b) Sympathetic nerve activity level Compared with the sham operation group rats, the rats were subjected to left coronary anterior descending artery ligation of 6 weeks after baseline sympathetic nerve activity level increased significantly (22.17 + 3.25 Δ mmHg vs 47.74 5.28 + Δ mmHg, $P < 0.05$); int group compared with the model group decreased (35.08 + 2.75 delta mmHg vs 47.74 5.28 + Δ mmHg, $P < 0.05$).
- c) Ligation of left anterior descending coronary artery in rats after 3 days, 1 week, 2 weeks, 4 weeks, 6 weeks and plasma catecholamine, PIC levels were compared with the sham operated rats, coronary artery ligation rats plasma NE levels with time prolonged significantly increased, e non significant difference; coronary artery node ligation group plasma pic levels were also increased with time and increased significantly (Figure 1).

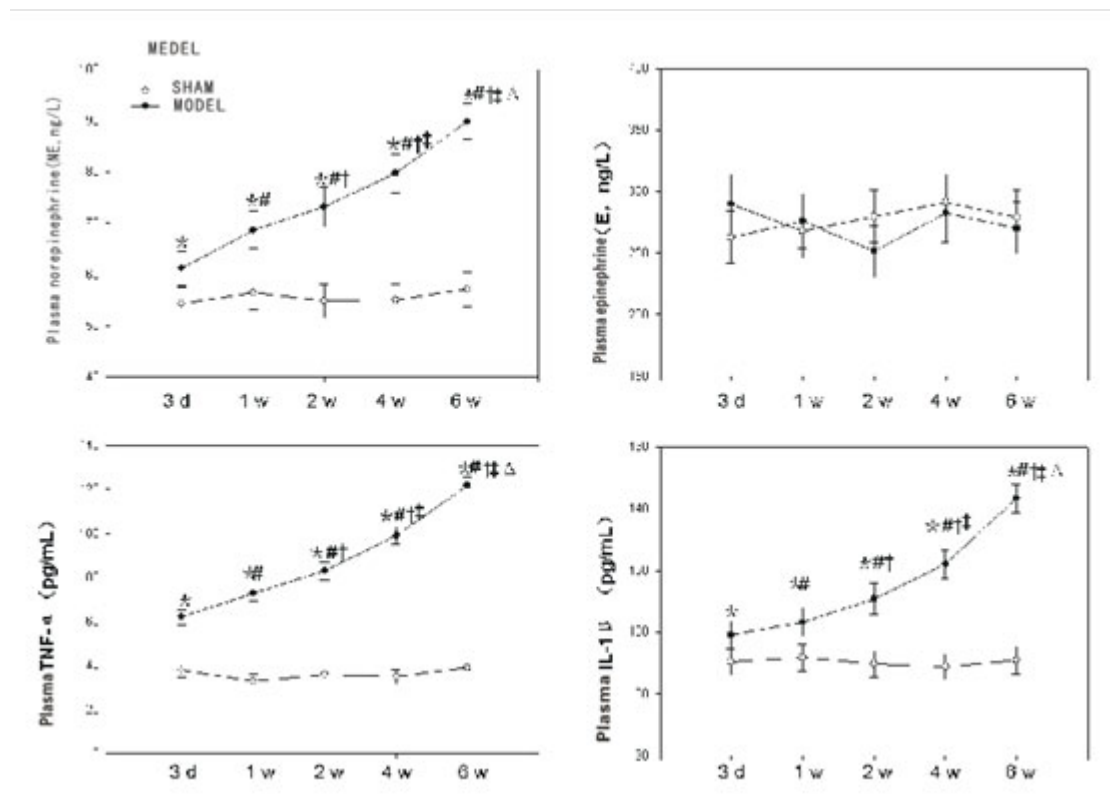


Fig. 1: Plasma catecholamine levels after operation. Compared with sham operated rats, the plasma NE level of the coronary artery ligation group was significantly higher than that of the E, while there was no significant difference between the two groups. Data to indicate. * at the same time with the sham operation group compared ($P < 0.05$). # and coronary artery ligation 3 D compared ($P < 0.05$). Compared to the 1 W † and coronary artery ligation ($P < 0.05$). Compared to the and coronary artery ligation in 2 w ($P < 0.05$). Compared to the Delta and coronary artery ligation for 4 W, $P < 0.05$.

d) Ligation of left anterior descending coronary artery in rats after 3 days, 1 week, 2 weeks, 4 weeks, 6 weeks central pic levels were compared with the sham operated rats, coronary artery ligation group rat paraventricular nucleus (PVN) and rostral ventrolateral medulla Department (RVLM) in TNF alpha, IL-1 beta level from 3 days to 6 weeks were significantly increased, but between each time point without significant difference. (Figure 2)

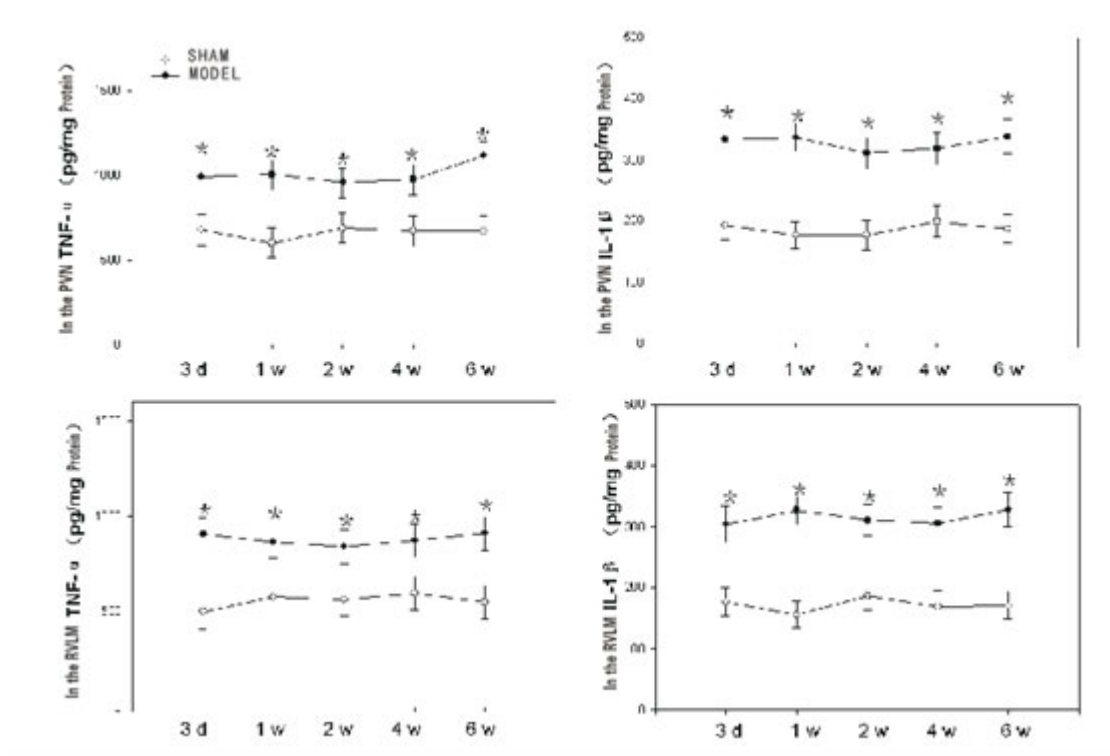


Figure 2: PVN and TNF-α in RVLM and IL-1β after operation. Compared with sham operated rats, 3 D, 1 W, 2 W, 4 W, 6 W, RVLM, PVN, TNF-α, and the levels of and IL-1β in the coronary artery ligation group were significantly higher than that in sham operated rats. Data to indicate. * compared with sham operated group at the same time point, P<0.05.

e) The effect of RAS intervention on the level of immune response and sympathetic nervous system activity in the peripheral level of the central nervous system. Compared with group Sham, the levels of TNF-α, IL-1β and NE in group Model were significantly increased (P mean <0.05), and E had no significant change (P>0.05). The levels of Int group compared with TNF-α group Model, IL-1β and NE were all decreased (P mean <0.05), and E had no significant change (P>0.05). (Table 2).

Table 2: Comparison of parameters of peripheral immune inflammatory response and sympathetic nervous system activity in rats after 6 weeks ($\bar{X} \pm S$, n=12)

Group	TNF-α (pg/ml)	IL-1β (pg/ml)	NE (ng/l)	E (ng/l)
Sham	36.27±3.04 [#]	87.60±5.05 [#]	52.37±4.62 [#]	259.96±13.17
Model	118.47±3.79 [*]	140.27±5.17 [*]	92.27±8.1 [*]	268.62±12.31
Int	61.22±4.02 ^{*#}	103.63±4.74 ^{*#}	64.44±5.71 ^{*#}	262.32±13.12

Note: compared with Sham group, *P<0.05; compared with Model group, #P<0.05.

f) Effect of RAS intervention on central immune response to central immune system. Compared with the sham group, model group PVN and RVLM of TNF-α and IL-1β levels were significantly increased (P < 0.05); int group PVN and RVLM of TNF-α and IL-1β level compared with model group PVN and RVLM of TNF-α and IL-1β levels decreased (P <0.05). (Table 3).

Table 3: Comparison of parameters of central immune system in rats after 6 weeks ($\bar{X} \pm S$, n=12)

Group	TNF-α (pg/mgprotein)		IL-1β (pg/mgprotein)	
	PVN	RVLM	PVN	RVLM
Sham	734.22±42.04 [#]	484.82±32.37 [#]	189.66±22.02 [#]	174.47±20.05 [#]
Model	1018.47±105.79 [*]	881.73±62.45 [*]	369.97±25.82 [*]	304.04±24.47 [*]
Int	821.04±41.02 ^{*#}	618.54±35.57 ^{*#}	263.24±24.04 ^{*#}	231.15±15.48 ^{*#}

IV. DISCUSSION

Chronic heart failure (CHF) is a serious hazard to human health, but the treatment effect is not good enough. Urgent need to explore the mechanism of CHF disease progression in order to find a more effective treatment. There is an interaction between sympathetic nervous system and immune system activation in the CHF state. In the past, most of the researches are based on the activation of sympathetic nervous system and immune system, which is an effective method for the treatment of CHF. Less research about the interaction between sympathetic nervous system and immune system in CHF, especially the change of the peripheral activity of a certain factor. Studies have shown that CHF myocardial ischemia and infarction by autonomic nerve afferent signals reach the central, thereby inducing central pic increased generation [5, 8], and central pic and ROS[2; 7]; mutual effect of 8] and RAS[9] system in control of sympathetic activity, inhibition of central pic can reduce the CHF of the sympathetic nervous system excitability [6,7]. However, it is not clear whether CHF and RAS in the PIC state of cardiovascular central nuclei, such as the nucleus of the hypothalamus (PVN) and the rostral medulla (RVLM), mediate the inflammatory response. In this study, the CHF model of myocardial ischemia was made by ligation of the left anterior descending branch of the left coronary artery, and the central and peripheral sympathetic activity and immune inflammatory response were observed at different time points after ligation. Compared with the sham operated rats, coronary artery ligation rats plasma NE levels with time prolonged significantly increased, e non significant difference was found; coronary artery ligation rats plasma pic levels also with time prolonged increased significantly; coronary artery ligation group rat paraventricular nucleus (PVN), Yin cord rostral ventrolateral (RVLM) TNF alpha and IL-1 beta level from 3 days to 6 weeks were significantly increased, but between each time point without significant difference. Further, we use via mini osmotic pumps to the bilateral lateral ventricle for 6 weeks to give AT1 receptor blocker losartan intervention central RAS, observe whether it can reduce the coronary artery ligated rats the level of peripheral inflammatory reaction and the activity of the sympathetic nervous system, improve heart function; Results suggest that heart failure rat sympathetic nerve activity level was significantly enhanced and peripheral plasma TNF alpha, IL-1 beta and NE levels were significantly increased ($P < 0.05$), and given the AT1 receptor blockade losartan via mini osmotic pumps to the bilateral lateral ventricle administration intervention RAS in central nervous system after the excessive proliferation of strong sympathetic nerve activity level decreased significantly and peripheral TNF alpha, IL-1 beta and NE levels were decreased ($P < 0.05$). That

heart failure rat central RAS inhibition can reduce the peripheral excessive inflammatory reaction and the activity of the sympathetic nervous system, also found that the intervention after cardiac function was significantly improved, and the model group were significant differences ($P < 0.05$), suggesting that the cardiac function as with inhibition of Ras in central nervous system, thereby reducing the CHF when the excitement of the sympathetic system and outer peripheral immune inflammation. This study is expected to explain the mechanism of the interaction between the sympathetic nervous system and the immune system, and provide a new idea and basis for the prevention and treatment of CHF. In addition, this study on heart failure rats given AT1 receptor blockade losartan via mini osmotic pumps to the bilateral lateral ventricle administration intervention central Ras levels found the pivot pic levels were also significantly decreased, the interaction between the two and peripheral inflammation, sympathetic nerve activity regulation of network access and the specific mechanism still need further study.

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Intrathoracic Schwannoma: Diagnosis and Surgical Treatment. The Challenge Remains

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Abstract- Schwannoma is a benign neoplasm derived from Schwann cells. It is usually located in intracranial nerves, however intrathoracic presentation is possible, leading to compression of adjacent structures and symptoms. Its diagnosis is challenging and is achieved by imaging tests. Treatment consists of surgical resection by thoracotomy or thoracoscopy. This study aimed to review the subject, with an emphasis on the diagnostic and therapeutic approaches currently available. Articles were selected by searching the Scopus, Scielo, PubMed and Web of Science databases using the keywords: schwannoma, neurinoma, neurilemmoma, nerve tissue neoplasm, thoracotomy, thoracoscopy and mediastinal neoplasms. Intrathoracic schwannoma often presents as asymptomatic and is identified during routine imaging tests. The recommended treatment is surgical resection by thoracoscopy or thoracotomy.

Keywords: schwannoma, neuroma, neurilemmoma, nerve tissue neoplasm, thoracotomy, thoracoscopy, mediastinal neoplasms.

GJMR-I Classification: NLMC Code: WI 480



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Intrathoracic Schwannoma: Diagnosis and Surgical Treatment. The Challenge Remains

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Abstract- Schwannoma is a benign neoplasm derived from Schwann cells. It is usually located in intracranial nerves, however intrathoracic presentation is possible, leading to compression of adjacent structures and symptoms. Its diagnosis is challenging and is achieved by imaging tests. Treatment consists of surgical resection by thoracotomy or thoracoscopy. This study aimed to review the subject, with an emphasis on the diagnostic and therapeutic approaches currently available. Articles were selected by searching the Scopus, Scielo, PubMed and Web of Science databases using the keywords: schwannoma, neurinoma, neurilemmoma, nerve tissue neoplasm, thoracotomy, thoracoscopy and mediastinal neoplasms. Intrathoracic schwannoma often presents as asymptomatic and is identified during routine imaging tests. The recommended treatment is surgical resection by thoracoscopy or thoracotomy.

Keywords: schwannoma, neuroma, neurilemmoma, nerve tissue neoplasm, thoracotomy, thoracoscopy, mediastinal neoplasms.

I. INTRODUCTION

Tumors of neurogenic origin make up 20% of such tumors in adults and 25% in children and the vast majority are benign. They are classified as tumors originating from nerve cells (ganglioneuroma and neuroblastoma) and nerve sheath tumors (Schwannomas and neurofibromas) [1].

Schwannoma (neurilemmoma) was recognized and identified for the first time in 1910, by Verocay, and is defined as a neoplasm exclusively composed of Schwann cells of the nerve sheath, which generally affect sensitive fascicles of the cranial and intercostal nerves [2].

Schwannomas are derived from Schwann cells belonging to the peripheral nervous system with the function of producing myelin for axons [3]. They occur in close proximity to the nerve of origin, are grayish encapsulated masses, and can present cystic areas [3].

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They are usually benign, grow slowly, emerge at any age, though they are more common in people over 40 years old, and show no preference for sex or ethnicity [3].

They occur most commonly as cranial nerve VIII tumors (acoustic neuroma) [3]. Although they are asymptomatic and are discovered accidentally by imaging tests, when extradural, their most common presentation is through tumor masses that can compress surrounding structures, becoming symptomatic in the process, as is the case of schwannomas from intrathoracic organs [3-6]. Most tumors of intrathoracic organs originate in the posterior mediastinum (posterior paraspinal groove), and only 5.4% arise from the chest wall [7].

They are difficult to diagnose and suspicion of diagnosis is the result of analyzing the format of surgical specimens, cell arrangement and immunohistochemical detection of the S-100 protein [2].

A mutation of the tumor suppressor gene NF2 shows a close relation with the presence of schwannoma [3].

The recommended treatment is surgical resection by thoracotomy or thoracoscopy. In the medical literature, few cases of mediastinal schwannomas exclusively treated by thoracoscopy have been reported [3,5,6].

II. METHODS

This review article was based on electronic searches in the PubMed, Scielo, Scopus and Web of Science databases. We collected data from case reports, cohort studies and literary reviews, using the keywords: schwannoma, neuroma, neurilemmoma, nerve tissue neoplasm, thoracotomy, thoracoscopy and mediastinal neoplasms. The method presented the following guiding question: “What are the main results and scientific evidence identified in national and international bibliographic production, concerning the therapeutic approach of intrathoracic schwannoma?”.

In the initial survey, the articles were evaluated by seven researchers (authors) according to the following inclusion criteria: articles published in Portuguese, English or Spanish, using the selected keyword combinations, published between 1969 and

2015 that were readily accessible. After the initial selection of material, articles repeated in different databases and that featured other tumors occurring in intrathoracic organs unrelated to schwannoma were excluded. The final material was composed of 47 scientific articles.

III. RESULTS

a) *Epidemiology*

Neurogenic tumors account for about 20% of all mediastinal neoplasms in adults and about 25% in children. Schwannomas and neurofibromas are neurogenic tumors of the posterior mediastinum [6,7]. The majority of neurogenic tumors in the posterior mediastinum originate from intrathoracic organs, while only 5.4% grow on the chest wall [8]. Schwannomas most commonly originate from the extremities, the head and neck [9]. Though these tumors occur in adults, they are often observed at younger ages [10]. They usually affect people in their thirties and forties, though at present, patient ranges from six to 78 years old and no predilection for sex or ethnicity has been reported [6].

b) *Pathology*

Typically, the intercostal nerve lies between the innermost intercostal and the internal intercostal muscles. In addition, it lies along the subcostal groove together with the intercostal blood vessels. It is known that when the neurilemmoma grows toward the external chest wall, it may be blocked by the bottom edge of the adjacent rib [11].

Because of this, schwannomas that originate from the intercostal nerve can project lumps into the thoracic cavity. It is worth pointing out that there are two possible forms of growth, tumors that develop within and outside the thoracic wall [11,12].

The first is the neurilemmoma, which arises from the lateral cutaneous branch of main intercostal nerve. On the chest wall, the intercostal nerve traverses a subcostal course and provides lateral cutaneous branches around the medial axillary line, while passing through the subcutaneous layers prior to and after this line [11,13].

The second possibility is an anatomical variation. The intercostal nerve can trace a path away from the subcostal groove, blocking the growth of external neurilemmoma [11].

Schwannoma is a neoplasm originated in the Schwann cells of the nerve sheath that usually affect sensitive fascicles of the cranial and intercostal nerves [12]. Cranial nerve VIII is the most affected [13]. They are encapsulated hard greyish masses, that remain in close proximity to the nerve of origin, and areas of cystic changes and xanthomatosis have been reported [3,14].

These tumors present two distinct growth patterns: Antoni A and Antoni B, can present multiple degenerative changes, such as nuclear pleomorphism,

xanthomatous change and vascular hyalinization, with no prognostic differentiation [3]. The growth pattern of cells present in Antoni A regions shows elongated fusiform nuclei with cytoplasmic expansions arranged in bundles in areas of moderate to high cellularity with minimal stroma matrix; "nuclear-free zones" of expansions are situated between the regions of palisaded nuclei associated with Verocay bodies [12]. The Antoni B growth pattern exhibits thinner cells loosely arranged within microcystic spaces and showing myxoid change. The cells present minimal cytoplasm, within which thin ill-defined extensions are observed that are not arranged into bundles [13]. The material between the cells is highly hydrated, and is matched by the increased T2 signal visualized on a MRI [14,15].

In most cases, a mutation of the tumor suppressor gene NF2 occurs on chromosome 22. There are three types of NF2, distinguished according to their clinical presentation and severity: Wishart, Gardner and mosaic type NF2. The Wishart type appears in childhood or late adolescence and consists of bilateral vestibular schwannomas associated with medullary tumors, whereas the Gardner type appears later, is less debilitating, and presents as bilateral vestibular schwannomas, with few meningiomas [15].

Malignant transformation is extremely rare in this type of tumor, although local recurrence following resection may be incomplete [14].

c) *Clinical presentation and diagnosis*

Thoracic schwannoma tumor growth is slow, which results in a poor clinical condition, with few or no symptoms, especially in the early stages. However, when the tumor reaches large proportions, commonly presenting as a bulky mediastinal mass, symptoms can arise as a consequence of the compression site, such as superior vena cava syndrome, dyspnea or dysphagia [3,16].

Sometimes schwannomas can develop into the trachea, through the intercartilaginous membrane, forming an hourglass shaped tumor. In the presence of bone erosion, severe pain or pathological fractures are common [13]. In about 10% of cases, growth can exceed the intervertebral foramen and compromise the spinal canal by in an hourglass shaped growth that causes paresthesia or paralysis. When this occurs, symptoms of intramedullary extension are present in 60% of cases [17-19].

In addition, patients can present more severe signs, such as hemoptysis, when the tracheobronchial tree is affected, or gastrointestinal bleeding, in cases involving the esophagus. Dysphonia can occur with vagus nerve involvement prior to the origin of the recurrent nerve [20-22].

Schwannomas usually occur alone, arising from any cranial or peripheral nerve, and it is very rare to find

multiple schwannomas arising from a single intercostal nerve [23].

The investigation of intrathoracic schwannomas begins with a full medical history and physical examination, followed by imaging tests. The majority of lesions are diagnosed in young adults with no predominance of sex [3].

Posterior-lateral (Fig.1) and profile chest radiographs are commonly the first examinations used to detect any changes. They generally delimit the portion of the mediastinum affected, but do not determine tumor density, invasion of the spinal canal or adjacent structures [22].

Regarding computed tomography (CT) (Figs. 2 and 3), the tumor normally presents as a homogeneous mass, with soft tissue density [23-25]. The presence of hypodense areas corresponds to areas of necrosis or hemorrhage. Neurilemmomas are characterized by several pathological areas: hypocellular areas adjacent to densely cellular areas or proximal to collagen or xanthomatous change; resulting in CT images with heterodense areas [22,24]. In CT, lesion appearance can be highly variable, but is usually well circumscribed [25]. In contrast, magnetic resonance imaging (MRI) shows better definition of the involvement of nerve plexi, vertebrae and the spinal canal. Hyperintense areas in T2 images correspond to cystic degeneration in the tumor [26].

MRI must be performed in patients with suspicion of neurogenic tumors of the posterior mediastinum, to exclude extension of the tumor in the intraspinal region [23]. As a result, from the moment the tumor develops, typical MRI signals (high intensity) can be observed that which enable a very precise diagnosis. Thus, preoperative radiological assessment alone is sufficient, i.e. fine needle aspiration is unnecessary [27].

By defining tumor extension more precisely, MRI enables preoperative planning that is more sensitive than CT at delineating the presence or absence of invasion through the neural foramen and the degree of involvement of the vertebral canal [25]. The diagnosis can be confirmed intraoperatively and by histopathological study [24].

Ancient schwannoma is a rare variant of the tumor that presents degenerative histological changes, which can lead to an incorrect diagnosis of malignancy. This rare status can simulate lung neoplasms in chest x-rays and CTs [28].

The radiological features of ancient schwannoma are not well defined due to its rarity. However, the long-term progression of the tumor leads to characteristic degenerative changes, such as cystic formation, calcification, hemorrhage and hyalinization³. Its appearance on CT and MRI is typical of this type of tumor [22,24]. Solid components encapsulated with cystic areas, or the presence of cystic masses with

marginal growth or with solid nodular components that present calcifications are observed [29,30].

Some authors suggest that a recommendation for surgical treatment must be considered when a patient has a mass hypervascular in soft tissues, containing amorphous calcification on the simple scan and cystic areas on the MRI [24,25]. The suggestion is that calcification of soft tissue, which is visible in a simple scan, is a characteristic indicative of this pathological entity [31].

A definitive diagnosis is only possible after histopathological examination. The most significant histological characteristics of these tumors are the presence of a high degree of nuclear atypia, with the presence of atypical hyperchromatic polymorphic cells, and nuclei that frequently containing multiple lobes [28, 32].

Fine needle biopsy can be useful in the diagnosis of anterior and posterior mediastinal tumors, but this technique is difficult to execute in the middle mediastinum, given that the amount of material is limited, thus it is not recommended for diagnosing these processes [22,33].

Microscopy reveals two distinct types of tissue, according to the Antonio classification: type A, corresponding to the cellular area; and type B, corresponding to the myxoid area. These two forms are usually associated in the same tumor [19].

Benign schwannomas are distinguished by the presence of a biphasic pattern (Antoni A and B) with the presence of Verocay bodies in type A pattern. These bodies are formed by two parallel lines of nuclei with a space between them that is virtually anuclear [34].

Immunohistochemical analysis shows immunoreactivity for S-100 protein, as reported for neurogenic tumors [35].

IV. DISCUSSION

a) *Thoracotomy x Thoracoscopy*

The treatment of choice for mediastinal schwannomas is resection by videothoracoscopy or open thoracotomy [36]. Thus, surgery is the main therapeutic route for neurogenic tumors of the mediastinum, and complete surgical resection is considered the gold standard [37].

The management of neurilemmomas located in the mediastinum is determined by the findings of CT or MRI exams. However, these findings only refer to intrathoracic tumors, or those that extend into intervertebral channel, due to visualization difficulties [25,38].

Benign neurogenic tumors rarely reappear and simple enucleation is sufficient, such that no adjuvant therapy is required. The challenge is to preserve nerve function, particularly when the tumor occurs on the phrenic or vagus nerve [37].

Preservation of the recurrent laryngeal nerve is essential, to prevent paralysis of the same, i.e. postoperative dysphonia. In resections of vagus nerve below the origin of the recurrent nerve, no cardiac, bronchial or gastrointestinal changes have been observed [39,40].

When the tumors originate on the intercostal nerves, if necessary, the nerve root can be sacrificed, resulting in relatively minor deficit [37].

In addition to the normal risks of thoracic surgery, such as hemorrhaging, infection and pulmonary morbidity, certain neurological complications can arise due to resection [26]. Among these, those that should be mentioned include deficits like Horner's syndrome, partial sympathectomy, recurrent laryngeal nerve injury and paraplegia [37].

Thoracotomy (Fig. 4) is a viable approach for masses in the middle and posterior mediastinum, and it is also adequate for the anterior mediastinum if the mass is fully contained within one hemithorax and does not cross the midline [3].

Video-assisted thoracoscopic surgery (VATS) was fully disseminated in the 1980s following technological improvements and consolidation of the laparoscopic technique. Indications for resection by videothoracoscopy include: biopsy to exclude malignancy, relief of compressive symptoms, to prevent extension of a tumor into the spinal foramen, and to prevent malignancy [6-8]. In video-assisted surgery the patient is positioned as per a lateral thoracotomy, and the camera is introduced into the fifth intercostal space, posteriorly for anterior mediastinal masses and anteriorly for posterior masses. Other accesses depend on the location of the mass. Postoperative recovery of neurological function depends on the type of surgery [3,7,16].

Among the majority of reported cases that exclusively used the VATS technique to resect mediastinal masses, a high degree of success was obtained, demonstrating the safety of the procedure in the hands of properly trained surgeons. When compared with thoracotomy, VATS requires smaller incisions, which reduces pain, causes fewer and less severe pulmonary complications, shortens hospitalization and promotes earlier return to activities and aesthetic gains. Prognosis after surgery is good, but local recurrence can occur following incomplete resection of the lesion [3].

If complete resection cannot be performed, a common situation when dealing with malignant tumors, postoperative radiation therapy is the recommended course of action. Occasionally, postoperative chemotherapy can also be effective [24,25].

The majority of mediastinal neurogenic tumors occur in the posterior compartment, and the best surgical approach is a standard thoracotomy. However,

VATS is an excellent choice for simple neurogenic tumors [41,42].

Tumor excision is curative, since the recurrence of benign schwannomas is unusual [22,43]. Malignant degeneration of a benign tumor has been described, but it is rare [44]. Although rare and infrequent, intrathoracic schwannomas of the vagus nerve should be included in the differential diagnosis of mediastinal tumors [22].

Conducting a preoperative assessment regarding intraspinal involvement is essential, in order to decrease the risk of hemorrhaging into the spinal canal and spinal cord damage [30-32]. When a tumor is identified in this region, the recommended approach is thoracic surgery and neurosurgery. Initially, this process was performed in phases, beginning with a laminectomy, followed by a thoracotomy at a later date [18,45].

Currently, the preferred option is performing the procedure in a single operation, in which combined resection is the method of choice. This can be performed through separate incisions or a shared incision [4]. A single incision, with a vertical component along the spine, and a curvilinear lateral extension, allows access to both specialties. Thus, a laminectomy can be performed to remove the intraspinal component, while the thoracic component can be excised by thoracotomy [10-13]. This allows for excision of the entire mass and minimizes the risk of undetectable hemorrhage inside the spinal canal, where a hemotoma could result in neurological deficit [18,45].

More recently, Vallieres *et al.* described an approach that uses posterior microneurosurgical techniques and anterior VATS techniques to perform a minimally invasive complete resection [46].

A careful preoperative assessment is essential to clarify whether there is any spinal canal or neural foramen involvement, so that the risks of hemorrhage and neurological damage are reduced significantly [4-6]. Treatment involves complete surgical resection via thoracotomy or thoracoscopy with neurosurgical exploration, to verify whether tumor has extended into the spinal canal [27,28]. Although recurrence is rare and patients present a good prognosis, since the tumor is benign, when dealing with malignant neurogenic neoplasms, prognosis is poor [3].

Fine needle biopsy can be performed; however, a precise diagnosis may not be possible due to limited cellularity. This raises the possibility of a misdiagnosis of malignancy, since the appearance of histological degenerative changes can occur. Surgical excision of the mass is the gold standard for the diagnosis and treatment of these potentially resectable tumors [47].

V. CONCLUSION

Intrathoracic schwannoma is often asymptomatic, and the lesion is usually detected in routine imaging tests. Thus, its diagnosis is a challenge and should not be discarded as diagnostic hypothesis in the presence of mediastinal masses.

Magnetic resonance imaging is the preferred image examination for preoperative planning, since it presents clearer observation of the involvement of nervous plexi, vertebrae and the spinal canal.

The recommended treatment remains resection by thoracotomy or VATS, and recurrence of benign neurogenic tumors following the procedure is rare and does not require adjuvant therapy.

In addition to the risks common to any thoracic surgery, neurological complications should be taken into consideration during the surgical approach.

Among the surgical approach, open surgery continues to be the most commonly used method for treatment. VATS assists in realization of biopsies to exclude malignancy, to relieve compressive symptoms and to prevent extension of the tumor into the spinal foramen.

In cases where VATS is used for tumor resection, prognosis is good, but relapse can occur when the resection is incomplete and complementary treatment with chemotherapy or radiotherapy is recommended.

In the medical literature, few cases of thoracoscopic mediastinal schwannomas exclusively treated by VATS have been reported. However, there is space for all the surgical modalities, and the method should be applied on a case-by-case basis. In this context, doctor and patient should be similarly engaged in choosing the best method to achieve the expected result.

Conflict of interest statement

The authors have no conflicts of interest to declare.

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FIGURE LEGEND

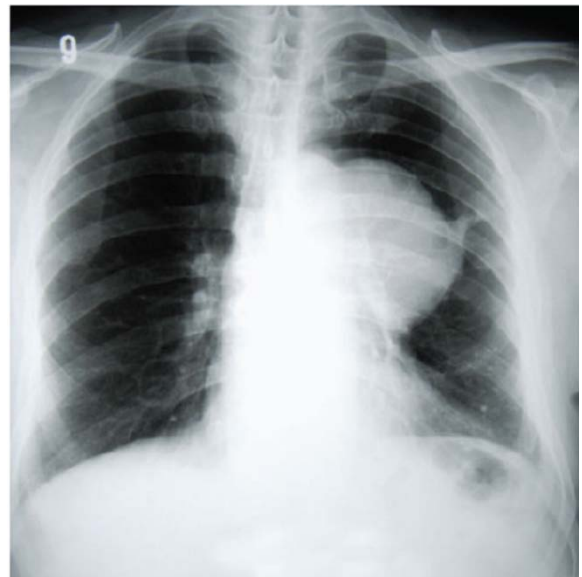


Figure 1: A well-circumscribed mass in the middle lung field.

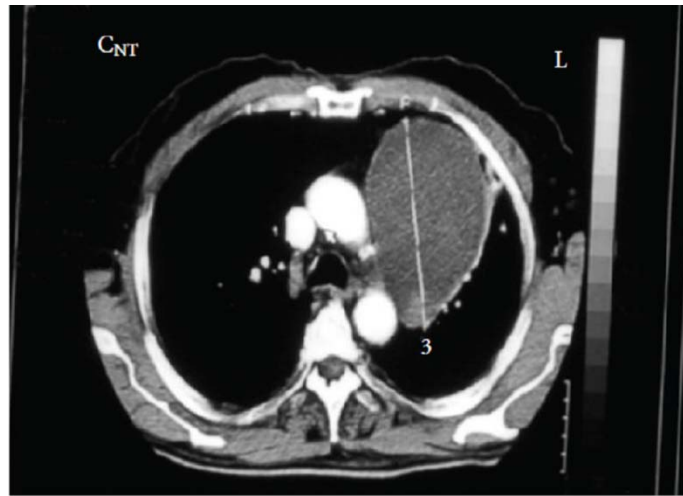


Figure 2: Computed tomography shows a homogeneous cystic mass at the costosternal junction.

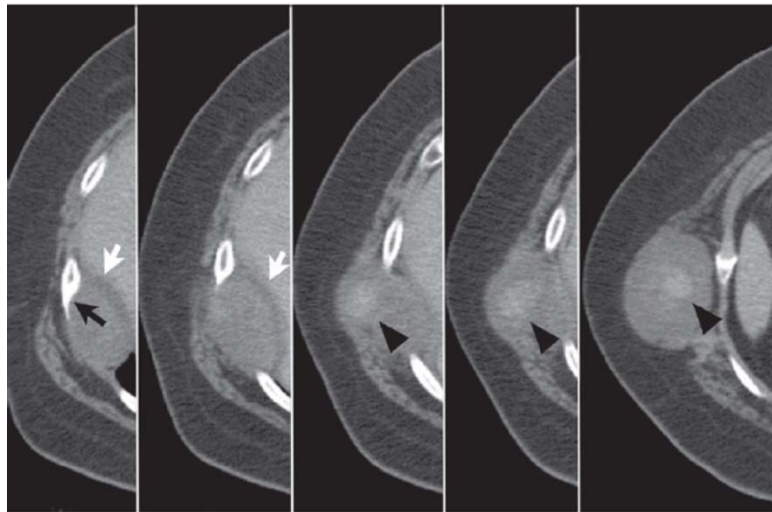


Figure 3: Axial post-contrast CT revealing the inner component of the mass compressing the liver and bulges through the intercostal space into the outer thoracic wall. The tumor erodes the adjacent inferior margin of the 9th rib (black arrow) and shows central enhancement (black arrowheads).

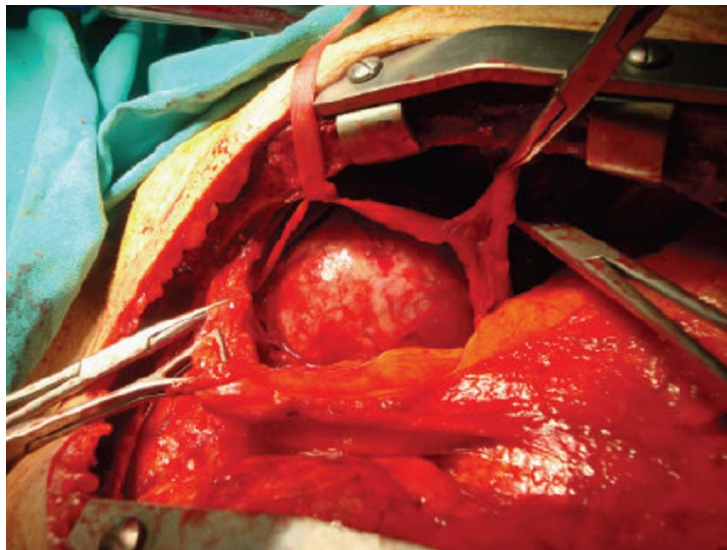


Figure 4: Operative view after sternotomy and preserving the vagus nerve; huge mass occupying the aortic arch.



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Risk Factors Associated with Coronary Artery Disease in Gaza

By Samy H. Khwaiter & Abdalla Abed

Islamic University Gaza

Abstract- Aim: Coronary Artery Disease (CAD) is considered the most life threatening disease in the world. Our study aims to estimate the association of lipid profile, other risk factors with CAD development.

Method: Blood samples were taken from cross-sectional sample (n=94) of CAD inpatients (68 males and 26 females) recorded at the period of 1/6/2008 to 16/8/2008 at El-shefaa hospital of Gaza. The patient history of age, sex, BMI, diabetic, hypertension, smoking, physical activity, stress, working and family history were collected by questionnaire, hospital administration and nursing data in coordination with the Department Physicians. We have conducted this study on hospitalized Palestinian CAD patients. Results: the percentage of gender were (72.3%) males and (27.7%) females, the mean patients age was 57.3 yrs. within range (45 – 66 yrs.). the means of serum cholesterol, triglyceride (TG) and Low Density Lipoprotein (LDL) were lowered and closed to international ranges, unlike High Density Lipoprotein (HDL) level. In addition, the distribution of Sedentary Physical Activity was the highest CAD risk factor, particularly females were higher than males (P=0.001), male smokers were the second highest risk factor and the stressed females were the third highest risk factor (P=0.001). In addition, we noticed the total cholesterol/HDL ratio is higher indicator than LDL/HDL and HDL/LDL ratio.

Keywords: low density lipoprotein, high density lipoprotein, serum cholesterol, coronary artery disease.

GJMR-I Classification: NLMC Code: WG 595



Strictly as per the compliance and regulations of:



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Samy H. Khwaiter^α & Abdalla Abed^σ

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Conclusion: the means of cholesterol, TG, LDL and HDL were low and close to international ranges, while, the distribution of Sedentary Physical Activity of females, male smokers and the stressed females were the highest risk factors. All of those results are depend on genetic factors, life style and nutrition in our area. In addition, we noticed the total cholesterol/HDL ratio is most effective CAD indicator.

Keywords: low density lipoprotein, high density lipoprotein, serum cholesterol, coronary artery disease.

I. INTRODUCTION

CAD has been remaining the first killer and the major cause of public health problems in the world, which is one of the most common causes of morbidity and mortality in different communities (Hadii et al., 2016). however, CAD is the main cause of death in the United States of America among human adults representing approximately one-third of all dead people, who are over the age of 35 yrs. (Hadaegh et al., 2009). CAD develops through narrowing of the coronary arteries which leads to death of portion of the heart muscle because of lacking of blood flow that supply

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oxygen and nutrition, and leads to heart attack (Fakhrzadeh al., 2008). Which is depend on different factors. CAD development and progression is stimulated by environmental and/or genetic factors. The environmental factors include tobacco use, diabetes mellitus (DM), and hypertension (Hadii et al., 2016). In most cases, CAD has a multifactorial genetic basis, involving a number of genes and environmental factors, which are interacting to determine whether or not the disease will develop as well as its severity (Hadii et al., 2016). Several biochemical processes participating in CAD development, include lipid and apolipoprotein metabolism, inflammatory response, endothelial function, platelets function, thrombosis, fibrinolysis, and blood pressure regulation (Marenal., 2008). Lipid blood profile plays the essential role of lipid deposition in artery wall and CAD development, by accumulating the LDL inside layers of artery wall, except HDL which has beneficial effects for a number of reasons by decreasing lipid oxidation after depositing in blood vessels, leading to retarding CAD development. In other observational studies were shown that each 1-mg/dL decrease in plasma HDL concentration is associated with a 2% to 3% increased risk of CAD (Chapman et al., 2004). So, HDL is called "good cholesterol" according to its beneficial role in blood vessels by many mechanisms to prevent LDL from depositing on blood arteries, in contrast LDL is called "bad cholesterol" due to its role.

II. CORONARY ARTERY DISEASE RISK FACTORS

a) Uncontrollable CAD risk Factors

Age: Is among the most important risk factors for predicting incident cardiovascular disease. Based on previous experience studies in the United States the average risk of developing cardiovascular disease for a 30-34 year old male is 3%, this number raises some sevenfold to 21% for a comparable individual aged 60–64 years (Wilson et al., 1998). The exact importance of age-related risk compared with other cardiovascular disease risk factors illustrated by the Framingham Heart Study that has resulted in a 14-point scoring system to predict incident 10-year cardiovascular disease. In this system, the increasing risk characterized by a higher score, up to 7 points can be attributed to age alone (Stocker et al., 2004). According on a previous Research, that suggests that 80–90% of patients with

CAD have at least 1 of the 4 modifiable risk factors (DM, hypertension, hypercholesterolemia and smoking) (Canto et al., 2011).

Gender or sex; is important risk factor in incidence of CAD and many studies noted difference between male and female in CAD distribution among population (Canto et al., 2011).

b) Controllable CAD risk factors

The body mass index: Is a key index measurement for relating a person's body weight to their height. It had been used by the World Health Organization (WHO) as the standard for recording obesity statistics since the early 1980s (Eknoyan., 2008).

Obesity or overweight: Is defined as an excess in body weight with an abnormal high preponderance of body fat. The obesity has become a major public health issue in the United States (Bibbins et al., 2007) and the prevalence of obesity in the developed world is increasing at an alarming rate (Stocker et al., 2004). In addition, obesity leads to other metabolic disorders and constitutes a major cardiovascular risk. however, in fact, 50% to 66% of the world population is obese (Balkau et al., 2007).

Stress: Is the way of metabolic body reacts to change, includes our mental, emotional, and physical responses to the pressures of everyday life, with change is a natural and normal part of life, therefore a moderate amount of stress is part of normal living (Health Library., 2009). Stress may be good by acting body motivate and more productive, while the strong stress response is a harmful with set the body for general poor health as well as specific psychological or physical illnesses like heart disease or infection.

Hypertension: Is defined as a systolic blood pressure in excess of 140 mmHg or a diastolic blood pressure above 90 mmHg (Pressure., 1993). Uncontrolled high blood pressure can result in hardening and thickening of the coronary arteries, narrowing the channel through which blood can flow. In observation study it was referred that the hypertension was considerably more frequent among cases than control subjects. Therefore, the hypertension considers the main risk factor of CAD development in many populations (Hopkins et al., 2005).

- **Diabetes Mellitus (DM)**: is defined as an increased of blood glucose level (hyperglycemia). Recent and previous studies observed the presence of a strong association between CAD development and DM, therefore the DM is consider one of the main risk factor of CAD development (Nishigaki et al., 1981).

Cigarette: Smoking could promote atherosclerosis, in part, by its effects on lipid profile. Smokers have significantly higher serum cholesterol, triglyceride, and LDL levels, but HDL is lowering in smokers than in nonsmokers (Ambrose et al., 2003). It was estimated that the smoking increases atherosclerotic disease by

50% and doubles the incidence of CAD (Al-Refaee and Al-Hazzaa., 2001). The nicotine constricts blood vessels, and carbon monoxide (CO) can damage their inner lining, making them more susceptible to atherosclerosis. However in both animal and human models, several studies have demonstrated that the cigarette smoking exposure were associated with a decrease in vasodilatory function (Ambrose et al., 2003).

Physical activity: The regular exercise or physical activities consider the most important and the beneficial treatment methods for people that under CAD risk (Al-Refaee and Al-Hazzaa., 2001). In the United States of America (USA) an epidemiological research on physical activity revealed that the physical inactivity appears to be a more important CAD risk factor (Al-Refaee and Al-Hazzaa., 2001).

To the best of our knowledge, this is the one of the first studies in Gaza strip investigating the significance of the association of lipid profile and other risk factors with CAD development in Gaza population.

III. METHOD AND SAMPLE

a) Target Population

In this cross-sectional of population survey study, fresh blood samples of 94 CAD patients were collected from cardiology department of central hospital "El shefaa" of Palestinian Ministry Health – Gaza strip. In addition the period of samples collection started from 1/6/2008 to 16/8/2008.

The first confirmed diagnosis of CAD patients such as (Ischemic Heart Disease, Myocardial Infraction and Angina) was detected via cardiology department physicians.

Fresh blood samples were obtained from the fast hospitalized CAD patients and asymptomatic Patients without prior history of CAD or taking medications to control CAD risk factors, then it were analyzed by automatic spectrophotometer for serum cholesterol, serum TG, LDL and HDL.

b) Questionnaire

Other requested data were collected via questionnaire in English language. Data were collected using the standard interview method with physician of cardiology department, staff nursing and patients. The main questions were about personal history of hypertension, dyslipidemia, DM and CAD, smoking, use of smokeless tobacco and alcohol, diet. Questions concerning income, education and physical activity, stress, Body Mass Index (BMI) were included. Questions related to history of documented prior myocardial infarction (MI), unstable angina, coronary artery bypass graft (CABG) surgery, noninvasive investigations for CAD, coronary angiography, coronary angioplasty, documented use of drugs for CAD and hospital admission for CAD.

c) Analysis

All obtained data from questionnaire blood lipid profile values, HDL/LDL ratio, LDL/HDL ratio and total cholesterol/HDL ratio were entered and analyzed in Self-Propelled Semi-Submersible (SPSS) version 15 software, the following tests were applied: Frequency and distribution, Student T-test and Chi square test.

d) Ethical considerations

The approval letter for the present study was obtained from the Helsinki committee at the Palestinian Ministry of Health (MOH). In addition, all the subjects involved in the present study signed a formal consent form about their agreement to be involved in the present study. All parts of the present study were performed in accordance with the Helsinki Declaration of 1975.

IV. RESULTS

The sample size of the current study was 94 CAD Palestinian patients in Gaza strip, which included 68 (72.3%) males and 26 (27.7%) females. The mean of CAD patients age was (57.3±12.8 yrs), the mean age of males was (56.0±13.2 yrs) and for females it was (60.5±11.1 yrs), among three age groups (≤45 yrs), (46-65 yrs) and (≥66 yrs).

We noticed the distribution of CAD patients at higher risk were the middle age group (P<0.001). As shown in table-2 the mean of body weight was (83.0±12.3kg) and the mean of body height was (28.7±6.070 Cm), so the mean of females Body Mass Index (BMI) was higher than males with significant difference (P=0.001), while, the Overweigh females group were higher than males group with significant difference (P=0.001).

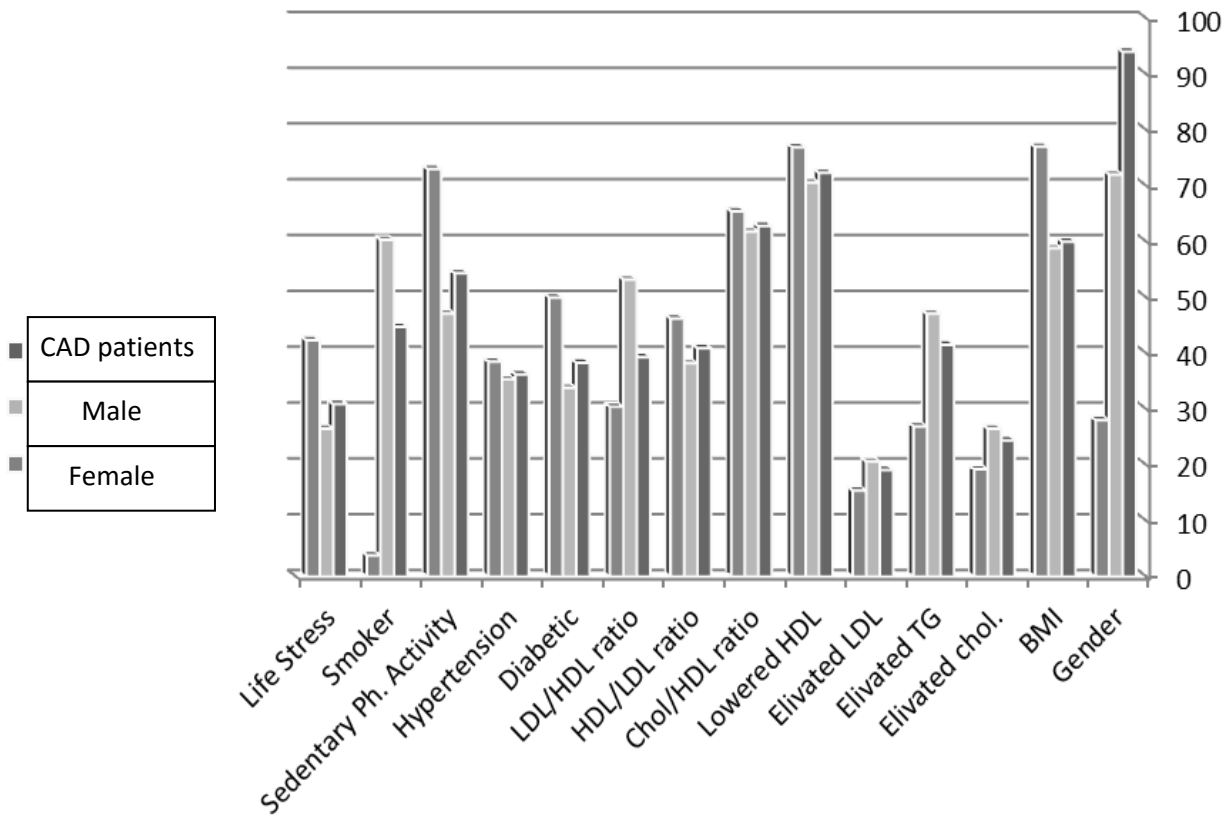


Figure 1: The distribution of CAD patients with CADF risk factors

Table 1: The average of risk factors and comparison in Palestinian (Gaza strip) CAD patients

Risk factor	Total (Mean +SD)	Male (Mean +SD)	Female (Mean +SD)	P-value (T-test)
BMI (kg/m ²)	(28.7±6.0)	(27.4±4.0)	(31.9±8.8)	P=0.001
serum cholesterol (<200mg/dl)	(167.3±62.2)	(166.0±57.7)	(170.8±73.9)	P > 0.05
serum TG (>150mg/dl)	(163.7±82.5)	(170.4±85.2)	(146.3±73.7)	P > 0.05
serum LDL (>160mg/dl)	(99.7±59.8)	(96.6±51.5)	(107.9±78.4)	P > 0.05
serum HDL (<40 mg/dl)	(34.8±12.5)	(35.3±13)	(33.6±11.2)	P > 0.05
Total cholesterol to HDL ratio (>4:1)	(5.3±2.8)	(5.0±1.9)	(5.9±4.3)	P > 0.05
HDL to LDL ratio (<0.3)	(0.5±0.4)	(0.5±0.4)	(0.4±0.3)	P > 0.05
LDL to HDL ratio (3.2)	(3.2±2.6)	(2.9±1.7)	(3.9±4.2)	P > 0.05

The significant difference is < 0.05 level.

The means of males hypercholesterolemia and hypertriglyceridemia were statistically higher than females (**P<0.008**).

In other side, the Sedentary Physical Activity was observed an elevated in our CAD patients, moreover, the mean of females was higher than males with significant difference (as shown in table 2). The

male Smokers were higher than females with no significant difference with regard (**P=0.302**). By contrast, the stressed females group were higher than males with significant difference (**P=0.001**). Moreover, during analyzed data we noticed the ratio of Total cholesterol/HDL (**62.8%**) was the most indicator than HDL/LDL (40.3%) and LDL/HDL ratio (39.3%).

Table 2: The number of distribution of CAD patients with CADF risk factors

CAD risk factor	Patients	Male	Female	P-value (chi square)
• Gender	100%	72%	28%	(P=0.001)
- (≥66year) group	22.3%	17.6%	34.6%	(P < 0.05)
- (46-65year) group	58.5%	60.3%*	53.8%	(P < 0.001)
- (≤45year) group	19.1%	22.1%	11.6%	(P < 0.05)
• BMI (Obese and Overweight)	60%*	58.8%	77%	(P = 0.003)
- Overweigh group	31.0%	25%	46.2%*	(P<0.001)
- Obese group	33.0%	33.8%	30.8%	(P < 0.05)
- normal weight group	36.0%	41.2%*	23.1%	(P = 0.003)
• Elevated cholesterol (>200mg/dl)	24.4%	26.5%	19.2%	(P < 0.05)
- high cholesterol level group (>240mg/dl)	17%	19.1%	11.5%*	(P < 0.008)
- the borderline level group (<240 – >200mg/dl)	7.4%	7.4%	7.7%	(P < 0.05)
- normal level group (<200mg/dl)	75%	73.5%	80.8%	(P < 0.05)
• Elevated TG (>150mg/dl)	41.5%	47.1%	26.9%	(P < 0.05)
- high level group (>200mg/dl)	23.4%	26.5%	15.4%	(P < 0.05)
- borderline level group (<200 – >150mg/dl)	18.1%	20.6%	11.5%	(P < 0.05)
- normal level group (<150mg/dl)	58.5%	52.9%	73.1%	(P < 0.05)
• Elevated LDL (>160mg/dl)	19.1%	20.6%	15.4%	(P < 0.05)
- high level (undesirable) group (>160mg/dl)	19.1%	20.6%	15.4%	(P < 0.05)
- normal level group (<160mg/dl)	80.9%	79.5%	84.6%	(P < 0.05)
• Lowered HDL (<40mg/dl)	72.3%	70.6%	76.9%	(P < 0.05)
- very high level group (>60mg/dl)	6.4%	8.80%	3.9%	(P < 0.05)
- high level group (<60 – >40mg/dl)	21.3%	20.6%	19.2%	(P < 0.05)
- low level (undesirable) group (<40mg/dl)	72.3%	70.6%	76.9%	(P < 0.05)
• Total chol/HDL ratio	--	--	--	--
- high ratio group (>4:1)	62.8%*	61.8%	65.4%	(P > 0.05)
- safe ratio group (<4:3.5)	13.8%	14.7%	11.5%	(P < 0.05)
- ideal ratio group (<3.5)	23%	23.5%	23.1%	(P < 0.05)
• HDL/LDL ratio	--	--	--	--
- high risk ratio group (0-0.9)	40.9%	38.2%	46.2%	(P > 0.05)
- moderate risk ratio group (0.9-0.14)	1.1%	0.0%	3.8%	(P > 0.05)
- average risk ratio group (0.14-0.22)	2.1%	1.5%	3.8%	(P > 0.05)
- low ratio group (0.22-0.30)	20.2%	20.6%	19.2%	(P > 0.05)
- normal ratio group (>0.30)	59.6%	61.8%	53.8%	(P > 0.05)

• LDL/HDL ratio		--	--	(P > 0.05)
- high risk ratio group (0-0.9)		4.0%	0.0%	(P > 0.05)
- moderate risk ratio group (0.9-0.14)		4.1%	1.4%	(P > 0.05)
- average risk ratio group (0.14-0.22)		20.0%	12.0%	(P > 0.05)
- low ratio group (0.22-0.30)		25.0%	17%	(P > 0.05)
- normal ratio group (>0.30)		46.8%	69.7%	(P > 0.05)
• Diabetic		33.8%	50%*	(P = 0.02)
• Hypertension		35.3%	38.5%	(P = 0.723)
• Sedentary Ph. Activity		47.1%	73%	(P=0.001)
• Smoker		60.3%	3.8%	(P = 0.302)
• Life Stress		26.5%	42.3%*	(P = 0.001)

* = The significant relation (is < 0.05 level).

In the current study the reference values for optimal and high levels of blood lipids profile were based on the world studies as follows; the National Cholesterol Education Program (NCEP) used the optimal serum cholesterol level <200 mg/dL, serum TG level <160 mg/dL, serum HDL level >40 mg/dL for both sexes and serum LDL optimal level was <100 mg/dL.

As shown in table-1 and 2, the mean age of CAD patients (57±12 yrs), and the mean age of female patients was (60±11 yrs). In addition we observed that the total mean of elevated BMI risk factor was (28.7±60 kg/m²).

- **Lipid profile:** In our study, the percentage of cholesterol in males have a higher level of cholesterol than females (**P=0.008**).

The distribution of the TG in our study as risk factor was 41.5% (47.1% males and 26.9% females), in addition, it was found that the TG males are higher than TG females.

The distribution of low serum HDL as risk factor was 72.3% (70.6% males and 76.9% females), in current study we noticed that the mean of serum HDL females was lower than males.

In the current study, it was found that the mean of serum LDL was (99.7±59.8 mg/dl) while the mean of males was higher than females. In addition, the distribution of serum LDL level (≥161mg/dl) is 19.1% (20.6% males and 15.4% females). Therefore, the males distribution is higher than females.

- **Other risk factors:**
 - The distribution of sedentary physical activity among females was significantly higher than their male counterparts (**P= 0.001**).
 - In addition it was found the distribution of cigarettes smokers as a risk factor was 44.7% (60.3% males and 3.8% females).

Also the distribution of females life stressed CAD patients as risk factor was the third highest factor. The means of males hypercholesterolemia and hypertriglyceridemia were statistically higher than females (**P<0.008**).

In other side, the Sedentary Physical Activity was observed an elevated in our CAD patients, moreover, the mean of females was higher than males with significant difference (as shown in table 2). The male Smokers were higher than females with no significant difference with regard (**P=0.302**). By contrast, the stressed females group were higher than males with significant difference (**P=0.001**). Moreover, during analyzed data we noticed the ratio of Total cholesterol/HDL (**62.8%**) was the most indicator than HDL/LDL (40.3%) and LDL/HDL ratio (39.3%).

In the current study the reference values for optimal and high levels of blood lipids profile were based on the world studies as follows; the National Cholesterol Education Program (NCEP) used the optimal serum cholesterol level <200 mg/dL, serum TG level <160 mg/dL, serum HDL level >40 mg/dL for both sexes and serum LDL optimal level was <100 mg/dL.

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V. DISCUSSION

In the current study the reference values for optimal and high levels of blood lipids profile were based on the world studies as follows; the National Cholesterol Education Program (NCEP) used the optimal serum cholesterol level <200 mg/dL, serum TG level <160 mg/dL, serum HDL level >40 mg/dL for both sexes and serum LDL optimal level was <100 mg/dL. The same values were used in regional studies such as; in Jordan (Hammoudeh et al., 2008), Islamic Republic of Iran (Qazvin) (Fakhrzadeh al., 2008), Islamic Republic of Iran (Tehran) (Hadaegh et al., 2009) and Palestinian (Jerusalem) and Jewish women (Jabara et al., 2007).

As shown in table-1 and 2, the mean age of CAD patients is similar to population of Iran as described in Tehran study. And the mean age of female patients is closed to population of Palestinian and Jewish women study (Jabara et al., 2007). So our study agreed with the result of those study (Fakhrzadeh al., 2008).

In the current study, we observed that the total mean of elevated BMI risk factor is closed to population of Iran and Jordanian, as described in Tehran study (Hadaegh et al., 2009), Qazvin study (Fakhrzadeh al., 2008) and Jordan study (Hammoudeh et al., 2008). Which is due to similarity of the demographic differences among the population as shown in various studies emphasize the fact that each society has its own demographic characteristics and social behavior, which is reflected on the overall findings of each study.

So we recommended to use the risky borderline >45mg/dl rather than >40mg/dl for female in our population, as recommended in Jordanian study (Hammoudeh et al., 2008).

- *Lipid profile:* In our study, we found that the average of cholesterol is the lowest of all the regional studies, while the percentage of cholesterol in males have a higher level of cholesterol than females, this agreed with Kuwaiti study, which found that the fasting level of hypertriglyceridemia more prevalent than hypercholesterolemia among Kuwaiti population and reported that the previous hypothesis of hypertriglyceridemia is an important risk factor for CAD patients in Kuwait (Olusi et al., 2003). While this does not agree with Tehran study (Hadaegh et al., 2009) and Jordanian study (Hammoudeh et al., 2008).

In addition, the distribution of the TG in our study as risk factor is less than populations of Qazvin study (Fakhrzadeh al., 2008) And Jordan study (Hammoudeh et al., 2008). Moreover, it was found that the TG males are higher than TG females, which is agree with Qazvin study (Fakhrzadeh al., 2008), and the mean of serum TG is nearly similar to that of Jordan study (Hammoudeh et al., 2008).

The distribution of low serum HDL as risk factor is higher than Qazvin study (Fakhrzadeh al., 2008), and in Jordan study (Hammoudeh et al., 2008) and Tehran study (Hadaegh et al., 2009). In addition, in current study we noticed that the mean of serum HDL females was lower than males, but higher than Jordanian study (Hammoudeh et al., 2008) and Tehran study (Hadaegh et al., 2009), while, in Jordanian study the author referred to the mean of low HDL was significantly lower in females CAD patients (Hammoudeh et al., 2008), but it does not agree with the Qazvin study. Moreover, in Qazvin study the author referred to the prevalence of CAD in African-American patients with low HDL level (Fakhrzadeh al., 2008). So we recommended to use the risky borderline >45mg/dl rather than >40mg/dl for female in our population, as recommended in Jordanian study (Hammoudeh et al., 2008).

In the current study, it was found that the mean of serum LDL is less Jordan study (Hammoudeh et al., 2008), while the mean of males was higher than females, which agreed with Jordanian study (Hammoudeh et al., 2008). In our study the distribution of serum LDL level (≥ 161 mg/dl) is closed to Qazvin study. While, the males distribution is higher than females, which doesn't agree with Qazvin study (Fakhrzadeh al., 2008). By comparing lifestyle and socioeconomic of Gaza population with Kuwait population, it was noticed that the level of LDL in healthy population was higher and the author referred that It seems likely that diet may be an important contributory factor to high LDL mean and distribution as cholesterol mean, particularly the saturated fatty acids, which those with 12 to 16 carbon atoms and increases LDL-cholesterol. Also, the author referred that the Kuwaitis eat a lot of saturated fatty acids from meat and cholesterol from eggs, dairy products and sweets and this may partly explain their high serum total cholesterol concentrations (Olusi et al., 2003).

In another study, it was referred that the diet of economically underdeveloped populations contain low total calories, saturated fat, and cholesterol (Rao et al., 1980), but our population has different lifestyle and socioeconomic situation. Therefore, we noticed the LDL mean and distribution were low. So, we recommend applying the new cut off >70mg/dl of LDL level, particularly in Cardiovascular Disease (CVD) patients, Diabetic and CAD patients under risk. The total cholesterol/HDL ratio is considered a good indicator for CAD prognosis and monitor. In general, lipid profile is determined mainly by the quality and quantity of food whether it is fat-rich or low-fat diet. This affects the lipid blood levels. Each society has its own food habits other risk factors should be taken into consideration as well. These facts may explain-in part, the differences between our study and other studies.

- *Other risk factors:*

- The distribution of sedentary physical activity among females was significantly higher than their male counterparts ($P= 0.001$), which agreed with Tehran study (Hadaegh et al., 2009). Also, in Tehran study the author referred that the women has lower levels of physical activity than men in general. Moreover, our result agreed with Arabic and Jewish study (Jabara et al., 2007), where the author reported that the Arabic women Jerusalem has less physical activity exercise, while the higher physical active population is protected by exercise, more than physical light and moderate populations (Jabara et al., 2007). Therefore, we suggested the same speculation in our population.

In our culture, females feel shy when they perform physical activity, for this reason the majority of females do not conduct activity at regular basis, in addition, many of the females in our society remain at their homes for long periods.

- In addition it was found the distribution of cigarettes smokers as a risk factor is higher than populations of Jordanian study (Hammoudeh et al., 2008), Jewish women, Palestinian women (Jabara et al., 2007) and Qazvin study (Fakhrzadeh et al., 2008), but less than Tehran study (Hadaegh et al., 2009).

Also the distribution of females life stressed CAD patients as risk factor was high, which agree with Arabic and Jewish study (Jabara et al., 2007). Therefore, we have suggested that the same condition is present in our population, especially the population of Gaza who are suffering from low socioeconomic and other conditions and this causes stress to population. Also, in Arabic and Jewish study, however, the author referred that the Palestinian women has less education and lower socioeconomic status than Jewish women. In addition, the Palestinian women patients were younger and had more children than Jewish women (Jabara et al., 2007), and the socioeconomic status particularly in women has consistently been associated with increased cardiovascular morbidity and mortality (Jabara et al., 2007). It was reported in other study, The psychosocial stress and lifestyle factors are related to most of increased risk factors (Hadli et al., 2016). In addition, other research suggests that the co-existence of biological and lifestyle/behavioral risk factors is highly prevalent in disadvantaged and underserved populations with low socioeconomic status (Everage et al., 2014).

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Clinical Presentation and Management of Recurrent Inguinal and Incisional Hernia in Khartoum Teaching Hospital

By Dr. Wael Mohialddin Ahmed Doush & Mohamed Almakki Ahmed Abdalla

Sudan Medical Specialization Board

Abstract- Background: Recurrent hernias are still relatively common in our practice. Despite the introduction of several therapeutic improvements, recurrent hernias still appear in 10- 15%. Therefore, reasons for a recurrence are discussed in a more fundamental way. It is assumed that a failure mainly depends on the quality of the repair.

Aim: This study aimed to review and assesses the clinical presentation of recurrent hernia and predisposing factors to recurrent hernia deal with the therapeutic options for management of recurrent hernia and evaluate the postoperative complications.

Patients and methods: Patients with incisional hernia and recurrent hernia referred for the surgical department at Khartoum Teaching Hospital, during the period for 15 months were prospectively studied using a structured questionnaire.

Results: Fifty patients were treated during study period. M: F ratio is 2:3. The age range was range between 21 to 80 years with mean age of 47 years. The majority of cases were incisional hernia n=34(68%).

Keywords: *incisional hernia; recurrent hernias; inguinal hernia; sudan.*

GJMR-I Classification: *NLMC Code: WI 950*



Strictly as per the compliance and regulations of:



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Dr. Wael Mohialddin Ahmed Doush ^α & Mohamed Almakki Ahmed Abdalla ^ο

Abstract- Background: Recurrent hernias are still relatively common in our practice. Despite the introduction of several therapeutic improvements, recurrent hernias still appear in 10-15%. Therefore, reasons for a recurrence are discussed in a more fundamental way. It is assumed that a failure mainly depends on the quality of the repair.

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Results: Fifty patients were treated during study period. M: F ratio is 2:3. The age range was range between 21 to 80 years with mean age of 47 years. The majority of cases were incisional hernia n=34(68%). The index surgeries leading to the incisional hernia were caesarian section n=19 (38%), exploratory laparotomy n=13 (26%). The only significant factor associated with development of the incisional and recurrent hernia was physical activity such as heavy lifting n=34(68%) P-value= 0.011. Other factor like overweight, multiple surgeries and when operator was a junior registrar were not significant. Seroma formation was the most common postoperative complication seen in about n=47 (94%) of the patients.

Conclusion: Incisional hernia is more common in lower segment caesarean sections and exploratory laparotomy. Recurrent inguinal hernias are more common with heavy lifting and conventional non mesh repair P-value=.005.

Keywords: incisional hernia; recurrent hernias; inguinal hernia; sudan.

I. INTRODUCTION

Abdominal wall hernia is regarded as a mechanical problem with a local defect which has to be closed by technical means. Despite the introduction of several therapeutic improvements, recurrent hernias still appear in 10-15%. A failure mainly depends on the quality of the repair. Regarding outcome curves after hernia repair, the cumulative

incidences for recurrences of both incisional and inguinal hernia show a linear rise over years. Considering the configuration of outcome curves of patients with hernia disease, it may therefore be insufficient to explain a recurrence just by bad technical repair. Furthermore, the quality of life and chances for employment are reduced in patients suffering from recurrent hernias. The present study aimed to evaluate patients were presenting with incisional hernia and recurrent hernia at Khartoum Teaching Hospital. Specifically our study aimed to review the current knowledge of predisposing factors to incisional hernia and recurrent hernia, as well as to review patient's data including age, sex, clinical symptoms and clinical signs of incisional hernia and recurrent hernia, furthermore to deal with the therapeutic options for the management of incisional hernia and recurrent hernia, and finally evaluate the early postoperative complications of incisional hernia and recurrent hernia [1].

II. PATIENTS AND METHODS

This is descriptive, prospective, small scale hospital-based study carried at Khartoum Teaching Hospital; Sudan for 15 months. All patients presenting with incisional hernia and recurrent hernia were included in this study. Data including demographic characteristic, clinical presentation, provisional diagnosis, modalities of investigation, previous history of surgery, risk factor of hernia recurrent, indications for surgery, types of hernia repair and post-operative complications were collected by a questionnaire. The diagnosis was done by clinical examination including visible swelling, visible cough impulse, presence of previous scar and reducibility.

The indication of hernia surgical repair in this study was recurrence. Open suture repair technique and open prolene mesh technique were used. All collected data were analyzed using a computer IBM SPSS program.

III. RESULT

Fifty patients of incisional hernia and recurrent hernia were treated during study period. Patients who underwent elective surgery at surgical department are n=48 (96%). Incisional hernias were more common in female than males (3:2) represent about (60%) of cases.

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The age range was between 21 to 80 years with mean age of 47 years. The majority of cases were incisional hernia n=34 (68%) gave a history of a lump or bulging=34 (68%) with dragging sensation n=17 (34%) that, elicited by physical activity such as heavy lifting or coughing, **Figure1, Table 1**. The index surgeries leading to the incisional hernia were caesarian section n=19 (38%), exploratory laparotomies n=13 (26%) are highly frequent in perforated duodenal ulcer n=4 (28.6%) and perforated appendix n=3 (21.4%), **Table 2, 3**. The only significant factor associated with development of the incisional and recurrent hernia was physical activity such

as heavy lifting n=34(68%) *P-value= 0.011*. Other factor like overweight, multiple surgeries and when operator was junior registrars were not significant [**Table 4**]. The indications of hernia surgical repair in this study are recurrence represent n=48(96%) of cases. Surgical treatments of recurrent hernia in this study include open suture repair technique, represent n=15 (30%) and open prolene mesh technique represent n=35 (70%)

P-value=.005. In this study seroma formation was the most common postoperative complication seen in about n=47 (94%) of the patients.

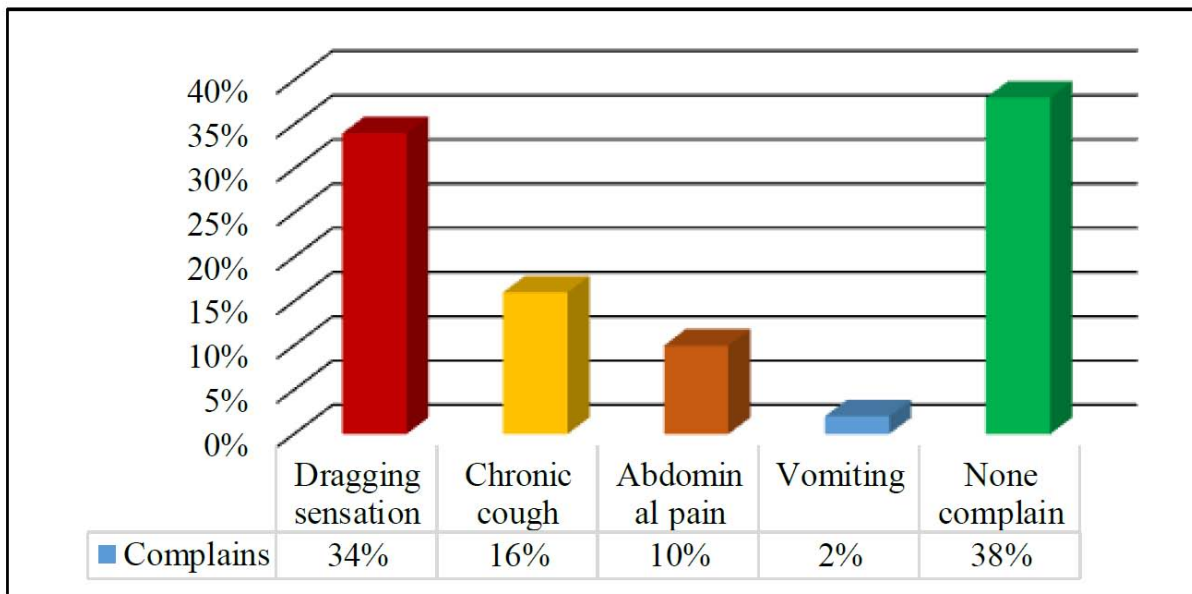


Figure 1: Associated complaints of patients with recurrent incisional and inguinal hernia

Table 1: Physical examinations of patients with recurrent incisional and inguinal hernia

Physical examinations		Frequency	Percentage
Visible swelling At: (n=50)	Recurrent hernia region	16	32.0%
	Abdominal wall	34	68.0%
Side of recurrent hernia(n=16)	Left Inguinal	5	31.2%
	Right Inguinal	5	31.2%
	Bilateral	1	0.6%
	Paraumbilical	5	31.2
Size of hernia (n=50)	1-2 cm	3	6.0%
	>2<5 cm	26	52.0%
	>5 cm	21	42.0%

Table 2: Previous original operation leading to development of recurrent hernia

Type of previous surgery	Frequency	Percentage
Multiparity (previous multiple caesarean section)	19	38.0%
Exploratory laparotomy	13	26.0%
Paraumbilical hernia suturing repair	5	10.0%
Open prostatectomy	3	6.0%
Cholecystectomy- laproscopic port hernia	2	4.0%
Vasicolithotomy	1	2.0%
Appendicular abscess open drainage	1	2.0%
Open appendicectomy	2	4.0%
Incisional hernia anatomical repair without mesh	4	8.0%
Total	50	100%

Table 3: Indications of laparotomy

Exploratory laparotomy indications (n=11)	Frequency	Percentage
Perforated duodenal ulcer	4	28.6
Perforated appendix	3	21.4
Sigmoid volvulus	1	7.1
Ruptured appendicular abscess	1	7.1
Perforated ileal typhoid ulcer	1	7.1
Partial Gastroectomy	1	7.1
Ruptured ectopic pregnancy	1	7.1
Uterine fibroid red degeneration excision	1	7.1
Penetrating abdominal injury (staping)	1	7.1

Table 4: Associated risk factors of incisional and inguinal hernia

Risk factors of hernia recurrence	Frequency	Percentage	P-value
Overweight (body mass index > 25 kg/m ²)	29	58.0%	0.258
Heavy lifting	34	68.0%	0.011
Multiple surgeries	26	52.0%	0.777
Asthma	8	16.0%	
Constipation	6	12.0%	
Prostatism signs (Urine retention)	1	2.0%	
Wound infection	13	26.0%	
Smoking	2	4.0%	
Surgical technique done by:			
- Registrar	14	77.8%	
- Consultant	4	22.2%	



Figure 2: Patients with incisional hernias (A) and (B) Huge visible lump, (C) and (D) long healed scar that weak abdominal wall [6]

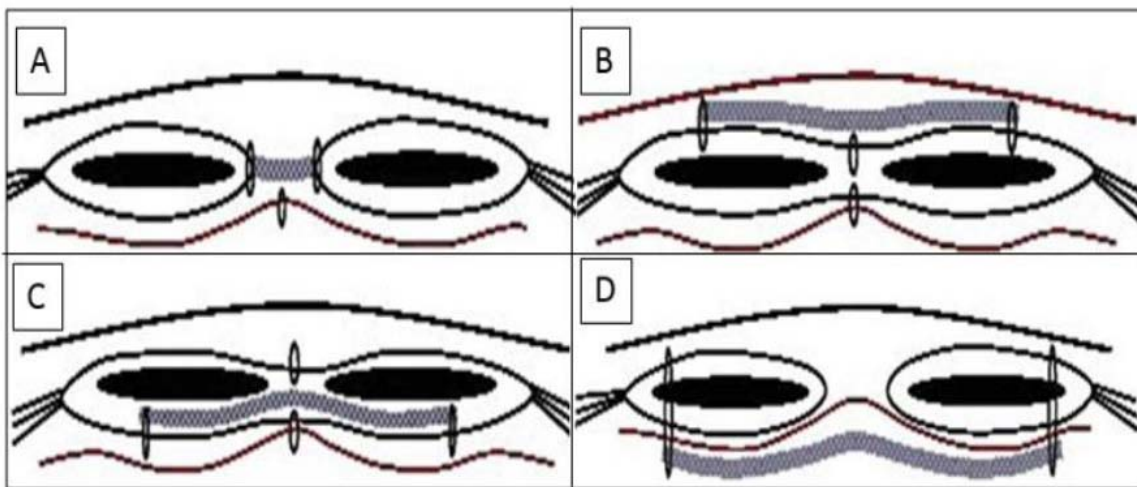


Figure 3: Mesh positions within the abdominal wall for open incisional hernia repair (A) Prosthetic bridging repair, (B) Onlay prosthetic repair, (C) Sublay prosthetic repair, (D) Inlay prosthetic repair [6]

IV. DISCUSSION

Fifty patients with incisional and recurrent hernias who underwent elective surgical repair were studied. There were 34 cases of incisional hernia complicated 672 cases of laparotomies done during the study period given rough estimate of incisional hernia about (5%). There were 16 cases of recurrent hernia and during the study 283 cases of hernia done during the study period given rough estimate of recurrent hernia about (5.6%).

Incisional hernias were more common in female than males (3:2) represent about (60%) of cases. This was due to fact that caesarean sections were more than 50% of cases, and this is in agreement with Williams M. study of hernia at USA noticed inguinal hernias more common in males than females (7:1) and incisional hernias affecting mainly females (2:1) [2].

The prevalence of incisional and recurrent hernia increases with age. Age range was between 21 to 80 years with mean age of 47 years. A similar finding was reported by Dtsch Arztebl that incisional hernia

patient's age was above 45 years and Agbakwuru EA. From Nigeria reported ages ranged from 25 to 70 years with median of 35 years. This can be explained by delayed wound healing in older individuals, with changes in fibroblast migration and structural changes with reduced collagen formation as well as the high prevalence of concomitant diseases [3, 6].

Patients with incisional and recurrent hernia commonly presents with unremarkable clinical symptoms, in the first instance. Most patients in this study with incisional hernia gave a history of a lump or bulge with dragging sensation (34%) that was elicited by physical activity such as heavy lifting (68%) or coughing (16%), and disappearing after stopping the activity. The acute cases of painful irreducible swelling associated with incarceration rare (10%). A similar finding was reported that discomfort and/ or a heavy dragging sensation associated with the hernia bulge, **Figure 2 [5, 6]**.

The high incidence of incisional hernia following lower midline incision of caesarean sections can partly due to the fact that, pregnant ladies are always subjected to prolonged or repeated stretching and weakness of the abdominal muscular tendinous structure. Furthermore, the lower midline incision anatomically has thinner anterior sheath with virtually no posterior sheath support of the linea alba. It has also been attributed to the orientation of the incision, which is parallel to the line of forces acting on it. This is in agreement with study of Agbakwuru EA. et al. from Nigeria and Waseem M. from Pakistan [3,7]. The major possible predisposing factor identified in our study are physical activity such as heavy lifting (68%) most commonly in housewives followed by overweight (58%). Wound sepsis account (26%) of patients. Perhaps the usual reduced immune state of pregnancy and, combined with the emergency nature of the surgeries could account for this frequent involvement of sepsis. This has agreement with study of Dare FO. from Nigeria, Isrealsson. LA. from UK and Shaikh NA from Pakistan, that found the major predisposing factors included wound sepsis 79.5% and overweight 27.3% [8,9,10,11].

The indication of hernia surgical repair in this study was recurrence (96%). Thirty percent of the patients with incisional and recurrent hernias were operated using the open suture repair technique, while 70% using open prolene mesh technique. This was due to fact that, traditional defect repair using continuous or interrupted suture technique is now getting less popular due to a high relapse rate and wound infection, this is in contradistinction to the mesh repair which has low recurrence rates, less postoperative pain, and quicker return to regular activities. In 2002 a study from Europe showed that, inguinal hernia surgery recurrence rates was found to be higher in the non-mesh group (4.4%) than in the mesh group (1.4%) [4]. The gold standard

surgical repair for incisional hernia today is the sublay technique with relapse rates (2-12%), **Figure 3 [6]**.

In this study seroma formation was most common complication seen in all patients with incisional hernia. This was more than was reported in the literature where seroma affects (20%) of cases [7]. This can be explained by the less frequent use of wound surgical drain in patients with incisional hernia.

In this study wound infection was lower in patients with incisional and recurrent hernia (2%) than findings in literature which showed infection rate up to (14%) of cases. This was due to well respond of patients to prophylactic single dose of antibiotic and wound dressing [12, 13, 14].

V. CONCLUSIONS

Incisional hernia is more common in lower segment caesarean sections and exploratory laparotomy. Recurrent inguinal hernias are more common with heavy lifting and conventional non mesh repair.

VI. RECOMMENDATIONS

Mesh repair is superior to the conventional suture repair in inguinal hernia. Before any surgical operations, reduction of weight should be encouraged when appropriate. Future studies need to have larger sample size to determine the role of gender, race, age, molecular-biological study, financial cost and work abstinence in the development of recurrent hernias.

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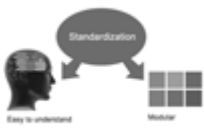
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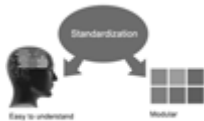


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Before start writing a good quality Computer Science Research Paper, let us first understand what is Computer Science Research Paper? So, Computer Science Research Paper is the paper which is written by professionals or scientists who are associated to Computer Science and Information Technology, or doing research study in these areas. If you are novel to this field then you can consult about this field from your supervisor or guide.

TECHNIQUES FOR WRITING A GOOD QUALITY RESEARCH PAPER:

1. Choosing the topic: In most cases, the topic is searched by the interest of author but it can be also suggested by the guides. You can have several topics and then you can judge that in which topic or subject you are finding yourself most comfortable. This can be done by asking several questions to yourself, like Will I be able to carry our search in this area? Will I find all necessary recourses to accomplish the search? Will I be able to find all information in this field area? If the answer of these types of questions will be "Yes" then you can choose that topic. In most of the cases, you may have to conduct the surveys and have to visit several places because this field is related to Computer Science and Information Technology. Also, you may have to do a lot of work to find all rise and falls regarding the various data of that subject. Sometimes, detailed information plays a vital role, instead of short information.

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30. Think and then print: When you will go to print your paper, notice that tables are not be split, headings are not detached from their descriptions, and page sequence is maintained.

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- Fundamental goal
- To the point depiction of the research
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Approach:

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What to keep away from

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Content

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Approach

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Approach:

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<i>References</i>	Complete and correct format, well organized	Beside the point, Incomplete	Wrong format and structuring



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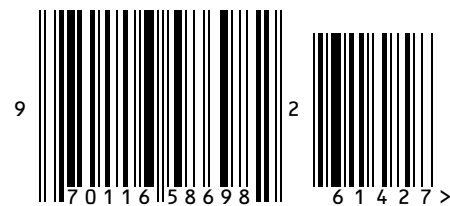
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