The principal blood vessels supplying the brain and face are the carotid arteries. In contrast to the left common carotid artery (LCCA), which emerges from the arch of the aorta in the thorax, the right common carotid artery (RCCA) begins in the neck from the brachiocephalic artery. Additionally, the internal carotid artery (ICA), which serves the brain, and the external carotid artery (ECA), which supplies the neck and face, divide the right and left common carotid arteries into two different blood vessels at the level of carotid bulb in neck [1]. The intima-medial thickness (IMT) is one of the markers of atherosclerosis that is widely used. A two-dimensional (2D) grayscale image is used to measure the IMT. Two echogenic interfaces are seen along the arterial wall in the best gray-scale image of the carotid artery with longitudinal scan, which passes by the center of artery. The interface between the blood and intima is represented by the upper echogenic line in the far wall, while the middle layer and outer layer are represented by the lower

**Introduction**

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echogenic line. No interface is created by the tunica intima and tunica media layers. The thickness of the inner and middle layer is indicated by the distance between the top and lower echogenic lines. The carotid artery should ideally be parallel to the probing surface in order to lessen the diagonal measurement’s tendency to overestimate the intima media thickness. The intima media thickness is generally determined on the distal common carotid artery at the far wall because it is less variable than the internal carotid artery owing to the beam angling with vessel depth [2]. Gray-scale imaging should be used to determine the size, location, and features of plaque in internal and common carotid arteries (CCA and ICA). The transducer should be angled caudally in the supraclavicular region and cephalically at the level of the mandible in order to obtain the most accurate images of the vasculature. To identify locations with aberrant blood flow that demand Doppler spectrum analysis, color Doppler imaging should be used [3]. Color Doppler sonography enables the real-time imaging of vascular lesions and accompanying flow irregularities, directs the cursor location on suspected sites of stenosis, and helps distinguish between critical stenosis and occlusion [4]. Real-time B-mode and color-flow images of these vessels are combined with the analysis of Doppler velocity spectra to identify and quantify stenotic lesions. There are several ways to calculate the degree of stenosis based on various velocity criteria, but they all exhibit significant variation [5]. For risk assessment, carotid artery sonography is performed; on a gray scale ultrasonography, CIMT in the common carotid artery is assessed. The plaques are classified as echogenic, calcified, or hypoechoic, or they may be connected to intraplaque hemorrhage, and surface ulceration [6]. Furthermore, tiny, nonstenotic (50%) plaque identification and echo morphology description are made achievable by the use of high-resolution B-mode real-time sonography. The general applicability of traditional duplex analysis is constrained because it has trouble identifying local changes in flow patterns near tiny plaques and distinguishing them from complicated blood-flow variants in the normal carotid bifurcation [7].

METHODS
Data from several search engines were retrieved for this literature view. Data for this literature study was collected from PubMed, science direct, NCBI, Medline, Medscape and Google scholar. Intima-media thickness, Carotid arteries and atherosclerosis were utilized as search terms for publication. Only those papers which shows that individuals with atherosclerosis with intima-media-thickness were included after conducting unbiased database searches. Research was evaluated for both its quality and its usefulness. Data extraction from the whole journal articles was done.

RESULTS
Only 20 articles were used for extraction of data related to sonographic assessment of carotid artery stenosis in atherosclerotic patients. The current study looked at the assessment of carotid artery stenosis.

DISCUSSION
Color Doppler US in combination with a grayscale image has shown to be a noninvasive technique to evaluate carotid artery atherosclerosis by measuring the intima-media thickness of the carotid wall. According to US recommendations, the susceptibility of atherosclerotic plaque is highlighted utilizing echogenicity. However, there are a number of drawbacks to using color Doppler US to assess plaque. A large calcification within the plaque first creates an auditory shadow that impedes further analysis of interior segments. Second, with greatly vessel bifurcation above at the level of mandible, it demonstrates the internal carotid artery. Third, in a complicated plaque
with atherosclerotic patient, ultrasound waves may be substantially reflected at the calcified boundary, which results in an underestimating of the plaque's susceptibility. Finally, a plaque that is evenly formed of fibrous plaque may have poor echogenicity within the arterial wall [10]. According to Mathiesen et al., smoking, high blood pressure, hyperlipidemia, male sex, and advanced age all contribute to a higher incidence of carotid stenosis [11]. In terms of prevalence, the majority of the plaques is hyperechogenic, followed by calcified plaque, moderately echogenic plaques, and low echogenic plaques. The majority of those with severe stenosis have a peak systolic velocity ratio of ICA/CCA > 1.5 [12]. Carotid duplex ultrasound has a 90% to 95% sensitivity and specificity range for measuring carotid diameter reduction, and it may be more sensitive to find small amounts of atherosclerotic plaque. Early detection, clinical staging, surgical planning, and postoperative therapeutic surveillance can all be referred to as carotid imaging objectives [13]. In rating ultrasonography plaques subjectively, Geroulakos et al., discovered good repeatability and a strong association with histology. Thus, the plaque's sonographic characterization plays a predictive significance. Currently, it is thought that anechoic or hypoechoic plaques, which are linked to an elevated risk of stroke, are caused by intraplaque hemorrhage or lipid deposits. Calcified plaques are typically stable and present in asymptomatic patients. A nidus for emboli that can result in transient ischemic stroke or cerebrovascular accidents can be irregular or ulcerated plaques [14]. It's possible that increased IMT, a sign of subclinical atherosclerotic disease, is a result of prior exposure to conventional risk factors. Even while IMT is present in the majority of patients with arterial hypertension, their degree of thickness is comparable to that of those without arterial hypertension. There is no correlation between other risk variables and IMT [15]. Atherosclerotic stenosis of the ICA, particularly in the proximal section, is the cause of about 10%–15% of all strokes and transient episodes with ischemic origin. Differentiating between a total ICA occlusion and a preclusive stenosis, which is defined as a stenosis of at least 90%, is crucial in the first workup of ICA stenosis. Surgery may be used to treat preclusive symptomatic stenosis [16]. The clinical acquisition of even more pertinent information about the relationship between biological age and early atherosclerotic changes, as well as the relationship between arterial hypertension, hyperlipidemia, diabetes, and other risk factors for ICV and the progression of atherosclerotic changes in the intima of carotid arteries, is made possible by ultrasound [17]. Imaging studies have also highlighted the possibility that stroke risk may depend on the plaque's morphological characteristics, such as ulcers or fissures that can rupture the plaque itself, in addition to the degree of stenosis. In order to reduce the frequency and severity of acute cerebrovascular illness, a proper diagnostic and preventative approach that focuses on risk stratification and treatment planning must therefore take into account all of these factors [18]. Furthermore, if collateral flow events associated with an ICA occlusion are mistaken for residual ICA flow, needless diagnostic procedures with a high risk of harm may be carried out [19]. Color Doppler with low PRF enables quick detection of the low flow conditions in the arteries distal to the occluded CCA. We can make judgments about the major cause of the obstruction and, in certain situations, the severity of obstruction based on the sonographic characteristics of the discrete thrombus. Bilateral CCA blockage is generally uncommon, mostly observed in atherosclerotic patients and Takayasu's arteritis [20]. The carotid arteries have a significantly bigger diameter and experience distinct hemodynamic conditions, according to commonly held belief, hence the situation is different there. Additionally, carotid arteries often generate symptoms by embolization without local vascular closure, whereas coronary arteries typically do so due to plaque rupture leading to thrombotic luminal occlusion. However, regardless of the level of stenosis, there is mounting evidence that active, unstable plaques in the carotid arteries are more susceptible to embolization [21]. The IMT of the distal CCA below the carotid bifurcation in cases of CCA stenosis is frequently determined noninvasively using ultrasound imaging in particular. The IMT readings determined by various factors using this technique are subject to both inter-observer and intra-observer variability [22].

C O N C L U S I O N S
Color Doppler ultrasound is a non-invasive and easier modality of choice for evaluating the patient with atherosclerosis, it helps in diagnosis of flow as well as prediction of carotid artery stenosis.

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