"THEMYSTERIOUSWORLDOFALIENHANDSYNDROME:A REVIEW OF THE CONDITIONS"

Authors:-Dr.ManoranjaniAddanki*,DharmagaddaSpandana,Dhegavath Akshitha, Dasari Pooja, Devarakonda Vaishnavi, Dongala Manikanta.

DepartmentOfPharmacology
MallaReddyCollegeOfPharmacy,Telangana,India.

ABSTRACT

Alienhandsyndrome(AHS)isarareneurologicalconditionthatcausesinvoluntary movementsofalimb,typicallytheupperextremity,wheretheaffectedindividual experiences varyinglevelsof awareness and control. AHS is linked to strange sensations like thefeelingofbeingcontrolledbyanalienandasenseofdetachmentfromthelimb.Itsuggests asubstantial impairmentin personalautonomyand motorcoordination, caused by neurological conditions suchas tumors, vascular problems, and demonstrative diseases. AHS can becategorized intotwo types: parietal andcallous, dependingonthe brain regions they affect, and thesymptoms theycause areassociated with specific areas. The callous varietyis challengingtoidentifybecauseitisuncommonanditssymptomsarenoteasilynoticeable. Distinguishingbetweenpsychiatricdisordersisessentialforaccuratediagnosisand appropriatetreatment.AHSusuallyaffectsadultsandcanoccuralongsideotherhealthconditions.Ke ymotorbehaviorslinkedtothesyndromeinvolveinvoluntarygripping,clashesbetweenhands,andth eperceptionoflimbsfloating.Theoutlookisgenerally optimistic,asasignificantnumberofindividualswitnessimprovementsintheircondition through effective rehabilitation, medication, and psychological assistance.
Keywords:AlienHandSyndrome[AHS],Demonstrativeness,Callous,Rehabilitation.

INTRODUCTION

A unique neurologicaldisorder called alien handsyndrome (AHS) is characterized by involuntary, yet seemingly purposeful,limb movements, often accompaniedby a lack of awareness. In 1908, when a woman's left hand forcefullytried to strangle her against her will, gold-stein was thefirst to describe AHS [1, 2]. There is no data available on the frequencyor death rates associated with the illness due to its infrequency. Brain lesions, particularlystrokes that affect the right hemisphere and the corpus callosum, the neural bridge that connectsthetwohemispheresandfacilitatestheintegrationandtransmissionofinformation between them,are commonly linkedto thissyndrome [3].It manifests as a disconnection disorderandisprimarilytriggeredbytraumaorharmtothebrain's frontal lobes,whichplay a crucial rolein voluntary movements andexecutive functions. When theseareas are damaged, the hemispheres'harmonic communication is disrupted,causingone hand to move involuntarilywhile theother operates voluntarily[4].The brain's hemispheres are connected bya bundle of nerve fibers called the corpus callosum. The corpus callosum is responsible for thecommunicationbetweenthetwohemispheres.Whenthecorpuscallosumisdamaged,the twohemispheresareunabletocommunicateeffectively,leading toavariety ofsymptoms. Accordingtotheoriesof AHS,thelateralpromotercortex maybecomedis-inhibitedduetoa malfunctioninthemedialpromotercortex,whichregulatesinwardlyguidedmovements. Thiswouldresultinuncontrollablemovementsofthemuscles.AHSmayalsohappendueto damage inthe frontal-parietal brain network,which is responsible forselecting voluntary motoractions [5].Thebrainfoundations ofAHShave beenclarified bydevelopments in

neurosurgical,especiallyfunctionalmagneticresonanceimaging,whichdemonstratesthat the frontal lobe,which is typically activein the planning andinitiation of movement, is dormant duringmotoractivitiesin individuals withAHS. Instead, without the typical frontal lobe preparation activity, the primary motor cortex initiates movements independently.

HISTORY

TherenownedGermanneurologicalpsychiatrist curtgold-steindiscoveredthefirstcasein themedicalliteraturein1908withathoroughcasereportpublishedinGerman.Accordingto gold-stein'sstudy, aright-handerwomanhadsufferedastrokethataffectedherleftside,but bythetimeshewasseen,shehadrecoveredtosomeextent.However,her leftarmseemedto haveamindofitsown,performingactionsthatwerenotunderhercontrol[6]. Inrelationto thelefthand'spurposefulmovements,thepatientreportedfeeling"weird"andclaimedthat "someoneelse"wascontrollingthehandinsteadofher.Shestruggledtoreleaseherlefthand, which had firmly gripped onto an object. The left side's visual and tactile abilities were impaired. Though not verycommon, the left hand would sometimes moveon its own to clean thefaceorrubtheeyes.Shecouldmoveherleftarminresponsetospokencommandswith someeffort,butconsciousmovementswerelessaccurateorslowerthancomparable involuntarymotions[7].Thepatientwasabletomoveherleftarminresponsetospoken commands with some effort, but conscious movements were less accurate or slower than comparableinvoluntarymotions.Gold-stein's"doctrineofmotordyspraxia"includeda discussionoftheformationofvoluntaryactionaswellasapostulatedbrainstructurefor highercognitivefunctionslikevolitionandtemporalandspatialcognition.Accordingto Gold-stein,bothobjectperceptionanddeliberateactiononexternalobjectsrequirea conceptualframeworkthatorganizesthebodyandexternalspace[8].NormanSchwinger notedthatKurtGold-stein"wasperhapsthefirst tostressthenon-unityof thepersonalityin individualswithcalloussectionanditspossiblepsychiatriceffects"inhisseminalpapers examining the wide range of disconnection syndromes linked to focal brain pathology [9].

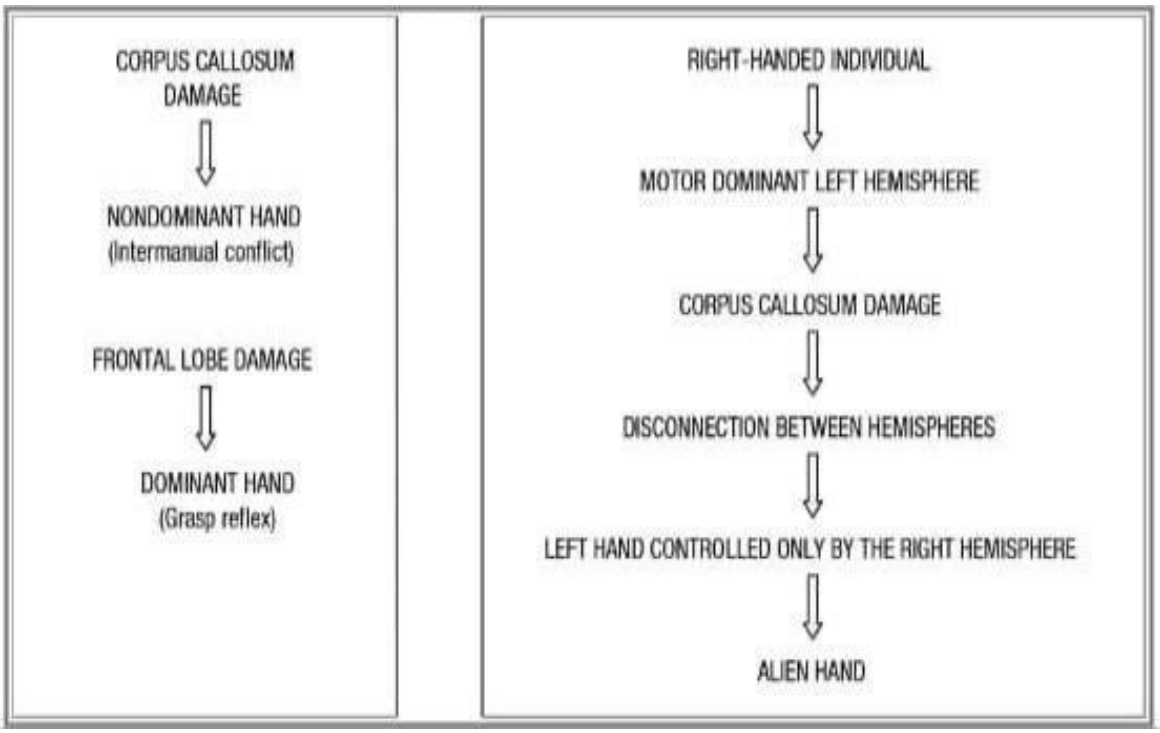
Types:

1. Cold Alien Hand Syndrome Thecondition in which one hand does somethingthat does not match theneeds of the otherhand is called incompatibility.The corpus callosum, which connectsthe twohemispheres ofthe brain,is oftendamaged inthis condition (Schwinger, 1979) [10]
2. or"rigidity" Hand perceptionis whatis meantby damageto thedorsolateral Cingulate cortex, which is usually associated with this condition (Schwinger, 1979) [10]
3. objects,oftenhaving"obsessive"or"compulsive"properties,istheessenceofthisgroup. Damagetothefaciallobe,especiallythemedialfacialcortex,isoftenaffected(Doodyand Jankovic, 1992) [11]. 4. Anarchic Hand Syndrome This type of disorder is characterized by involuntaryand uncontrollablehandmovements,mostlyofa“purposeful”or“objective” nature.Damagetothemedialaspectofthecortex isoftenassociatedwiththisproblem (Doody&Jankovic,1992)[11].5.PosteriorAlienHandSyndromeThistypeofcondition refers to hand movements, mostly of an “involuntary” or “automatic” nature. Damage to Theposteriorparietalcortexisoftenassociatedwiththisproblem(Bun-dick&Spillane, 2000) [12].

PATHOPHYSIOLOGY

AHSisthoughttobeassociatedwithtraumaticbraininjury aftersurgery, tumors,vascular events,andinfectiousdiseases.Healthproblemsincludehighbloodpressure,heartdisease, type2diabetes,infectiousdiseases,heartarrhythmias,obesity, andchronicsmoking[13]. The areasof thebrain mostaffected includethe prefrontal cortex,posterior parietal cortex, supplementarymotorarea,anteriorhoofmotorarea,thalamus,andcorpuscallosum,which control motor and non-motor functions. Motor symptoms maypresent as lack of coordination or inconsistentmovements ofthe lefthandinright-handed individuals.Sensorysymptoms mayincludethefeelingofaforeignhandoranextralimb[14].AHSmayrepresentchanges in the body schema, a dynamic, multi-sensoryrepresentation of the bodythat facilitates interaction with the environment and can be mediated by sharing members [15, 16].

AHS isdividedintotwo subtypes: Frontal andUnemotional. Thefrontal sub-type results from damageto themedial prefrontalcortex, which causesinvoluntary grasping and touching.Corporalinjuryisassociatedwithasub-typeofcallousdischerniation,themain feature of which is inter-manual involvement [17, 18].



Therightcerebralhemisphereismostcommonlyaffected,anddamagetotherightparietal cortex causes motor and sensory deficits [19]. Frontal lobe damage, particularlyin the temporal cortexand supplementarymotor areas, canimpair the immunesystem and lead to physical weakness [20].Good clinical care isessential in the diagnosis of alien hand syndrome (AHS), which can be seen in association with various neurological disorders [21,22].Becausethecorpuscallosumhasarichbloodsupply,corpuscallosumSMAisrare and, when detected, is usuallyassociated with otherbrain diseases, making diagnosis difficult [23]. AHSis present in paradigmaticdiseases such as congregationalistdegeneration and Alzheimer'sdiseaseand oftenpresentswithsymptomsofmotorakinesiaandlimbrigidity [24,25].Corticalsyndromesarecharacterizedbymotordysfunctionandareoftenassociated with various functional disorders. They may cause maxillary syndrome [26, 27].

COMMONCAUSES

AHScanbeopenforavarietyofreasons.Somepeopledevelopalienhandsyndrome aftera tumor, stroke, or injury. It is also sometimes associated with brain aneurysms, vascular disease, and cancer.Evidence suggests that AHSconnects to the nervepathways that divide the brain into two hemispheres[28].

- Tumor
- Infraction
- CorticobasalSyndrome
- Trauma
- Colostomy
- BrainDamage
- Infections
- GeneticFactors
- Auto-immuneDisorders
- Stroke
- TraumaticBrainInjury

SYMPTOMS

1. Involuntaryhand movements: According to Bun-dick and Spillane (2000),involuntary hand movements such as grasping, holding or manipulating objects can be observed in patients with AHS [29].
2. .InabilitytocontrolhandsAccordingtoSchwinger's(1979)research,patientswithAHS can exhibit aggressive behaviors, point or wave their hands [30].
3. EmotionalPain:AccordingtoSchwinger(1979),AHScancauseseriousemotionalpain such as shame, anger and depression [30].
4. Intermanual coordination disorder: According to Keratitis (1941), patientswith AHS sometimessufferfromintermanualcoordinationdisorder;inthiscase,themovementsofone hand are not synchronized with the movements of the other hand [31]
5. LackofawarenessAccordingtoDoodyandJankovic(1992),AHSpatientsmaynotbe aware that uncontrolled hand movements are occurring [32].

DIAGNOSIS

AnuncommonneurologicalconditionknownasAlienHandSyndrome (AHS)istypifiedby uncontrollably andinvoluntarily moving one'shand, whichfrequently leadsto unexpected consequences. ItmightbedifficulttodiagnoseAHS;however,thefollowingproceduresand resources can help.

DiagnosticCriteria:

1. Involuntarymovements:Onehandmaymoveinvoluntarilyandpurposelessly,andthese movements might be simple or complex [33].
2. Lossofcontrol:Thesensationthatonenolongerhascontrolovertheafflictedhand[33].
3. Interferencewithdailyactivities:Interferencewithsocialinteractions,emotionalhealth,or everyday activities [34].
4. Exclusionofotherillnesses:Determinewhetherepilepsy,Parkinson'sdisease,orperipheral nephropathy are any other conditions that could resemble AHS [35].

DiagnosticTools:
1. Clinicalexamination:Athoroughneurologicalexaminationtoevaluatecognitivestatus, motor function, and coordination [33].
2. Imagingtests:CTorMRIscanstoruleoutbrainabnormalitiesorstructurallesions[34].
3. Electrocardiographyinvestigations:nerveconduction,EEG,orEMGprocedurestomeasure electrical activity in the muscles and brain [35].
4. Parapsychologistevaluation:Evaluationofcognitiveabilities,suchasexecutivefunction, memory, and attention [36].

DifferentialDiagnosis:

1. ***Epilepsy***:Knownforfrequentseizuresthatcancauseuncontrollablemovements[37].
2. Bradykinesia,stiffness,andtremorsaresymptomsofParkinson'sdisease[38].
3. ***Peripheralnephropathy*:**Symptomsincludediscomfort,numbness,orparalysisinthe affected limb [39].
4. ***PsychogenicMovementDisorders:***Theseconditionsarecharacterizedbyinvoluntary movements, frequently involving psychiatric elements[40].

TREATMENT

Alien HandSyndrome (AHS) is arare neurological disordercharacterized byinvoluntary handmovements.Treatmentfocusesonsymptom managementandimprovingqualityoflife, offering various options for patients. Medications:
1. Botulinumtoxininjectionshelpreduceinvoluntarymovementsandimprovehandfunction [41].
2. Anticonvulsantslikecarbamazepineandvaluatecanhelplessenseizure-likeactivity related to AHS [42].
3. BenzodiazepinesmaybeusedtorelieveanxietyandstressassociatedwithAHS[43].
4. Dopaminemedications,suchaslevodopaandbromocriptine,maybeusedtomanageAHS linked to Parkinson's disease and other movement disorders[44].

Therapies:

1. Occupationaltherapyhelpsindividualsadapttotheirconditionandimprovehand functionality for daily tasks [45].
2. Physicaltherapycanimproverangeofmotion,strength,andcoordinationintheaffected hand [46].
3. Cognitivebehavioraltherapysupportspatientsincopingwiththeemotionaland psychological challenges of AHS [47].

SurgicalOptions:
1. Stereo-tacticbrainsurgerymaybeanoptionforpatientswithsevereAHSwhohavenot responded to other treatments [48].
2. DeepbrainstimulationmayhelpreducesymptomsofAHSinsomepatients[49].

AlternativeTherapies:
1. Trans-cranialmagneticstimulation(TMS)mayhelpreducesymptomsofAHSbyaffecting brain activity [50].
2. Trans-cranialdirectcurrentstimulation(tDCS)couldimprovecognitivefunctionand decrease AHS symptoms [51].

REPORTEDCASES

Case:1

A57-year-oldmalepatientpresentedwithamedicalhistoryofheartdisease,peripheral arterialdisease,epidemically,hypertension,anddiabetesmellifluous.Thereasonforadmission wasfemoropopliteal arterybypass grafting. No complicationsoccurred duringor immediatelyafter the operation. The patient's caregivers and nurses noted that the patient was lessalert,lesscurious,andlesstalkativeoneweekaftertheoperationthanbefore.However, he was stillable to communicate andunderstand. The caregivers also expressed concern that thepatientwassubjectedtoverbalandphysicalviolence.Theydidnotimmediatelynotify thedoctorbecausetheythoughtthepatientwouldbecomedepressed. Afterafewdaysof observation,thepatientwasabletowalkonhisownandcouldnolongerindependently performimportantactivitiesofdailyliving.Thecaregiversnoticedthathesometimesstruggled with hishands. For example, hecomplainedthat his lefthand was stealingthe TV remotecontrolfromhisrighthand.Sometimeshewillseevisions.Aneurological examinationwasperformedafternootherdiseasewasdetectedthatcouldaffecthis intelligencelevel.Accordingtothe neurologicalexaminationresults,thepatient's motor, sensoryandneurologicalfunctionswerenormal.Statisticaldataalwaysrespond.Itcannot causeabnormalreflexes.Hisbodyisstillhealthy.Hecannotspeakverywellbuthecan follow and follow instructions. Some of these aretranslations. The patient had agraphia in the left hand butno alexia.His righthand usuallymoves in the same wayas his left hand. When the patient istoldto do houseworkwith her left hand, she inevitablyuses herright hand. She alsohadimpairedjudgment,telegraphicproblems,andfingeragnosia onherlefthand.A clockdrawingisshown inFigure1.Tactileand visualdualstimulationtestsontheleftside werepositive.Twoweeksaftertheonsetofsymptoms,cranialmagneticresonanceimaging (MRI)showedmixedsignals(lowandhigh)onT1Wandhighsignalintensity(astral,temporal,andsp heroid)onT2W. drawing(framed)wasmade.Thereissomecortical atrophyinthefrontallobe.CranialMRAshowedmildabnormalitiesintheleftinternal carotid artery as well as the right internal carotid artery. According to carotid duplex ultrasound and MRA, there was mild inflammation in both carotid arteries [52]

Case:2

A 65-year-oldright-handed mansaid: “Isaw a hand reachout from behind meon the right side ofthe busand tryto pullme, thehand grabbed mylegand wouldn’t let go.At first. I thought someonehad hitme but after awhile Irealized itwas myrighthand, it didn’t look likeme.Myrightarmfeelsstrangeandheavy. Iamhavingpalpitationsand Ifeelverysick, anxiousandscared.Abriefincidentlastingafewminutesoccurredatthepatient'sresidence andincludedthefollowingstatements:"IcouldnotsleepallnightbecauseIwasafraidthat myright handwould challenge me in mysleep, mymental health and mymental illness."All of the test results were positive. In addition, laboratory tests included hemoglobin concentration, white blood cell count, erythrocytesedimentation rate, blood sugar, bloodurea, plasma electrolytes,calcium ions, STD screening tests, lipids, liver function tests studies,proteinelectronmicroscopy,coagulationstudies,T3andresults.Urineanalysis on T4,ECG,Dopplerultrasonically oftheneckandintracranialarteries,echo-cardiogramand intercostalelectroencephalogramwerenormal.Computedtomographyshowedfocalatrophy only inthe leftmedial frontalcortex. Afterthe patienttook 800mg ofthe drug daily,his seizures stopped for the next two years [53].

DISCUSSION

Aspergersyndromehas beenknownforoveracentury,butitsmechanismsremainelusive. Studieshaveshownthatbraindeteriorationcanleadtobi-hemisphericdis-inhibitionor inter-hemispheric disconnection, which may explain a variety of symptoms, including impulsivity, inattention, andcompulsiveness. Although functional studies have provided insightintoitspathophysiology,cautionshouldbeexercisedingeneralizingresultsbecause of small samplesizes and multiple underlyingfactors. Continued para-psychological testing and long-term follow-up may improve our understanding of the development of Asperger disorder[54].Patientswithmultiplevariants(Table-1)maypresentwithmixedphenotypes, makingitdifficulttolocalizetheirsymptoms.Therefore,allocationofpatientstospecialized clinics, although of educational interest, may not be essential for their care [55].

Type	Commonly Affected Areas	Common Causes	Symptoms and Signs
Frontal	Supplemental motor area	Tumors	Groping
	Cingulate gyrus	Infarction	Grasping
	Corpus callosum	Trauma	Utilization behavior
Callosal	Corpus callosum	Callosotomy	Intermanual conflict
		Tumors	
		Infarction	
Posterior	Parieto-occipital cortices	Infarction	Levitation
	Thalamus	Creutzfeld-Jakob disease	Cortical sensory deficits
		Corticobasal syndrome	Abnormal posturing of the limb

Table-1VariantsofAlienHandSyndrome

Thereislimitedevidencetosupporttheeffectivenessofpharmacologicaltreatmentsfor AHS syndrome. Benzodiazepinesand botulinum toxin injectionshave shown somebenefit, but mostoftheirsideeffectsarebehavioral.Theseincludepatientandcaregiveredu cation,visual education, hands-on interventions, and behavioral awareness. However, these recommendationsareoftenunrealistic,lacklong-termfollow-up,andhavelimitedevidence (Table 2).Due to the rarityof AHS syndrome,large-scale randomizedplacebo-controlled trials are unlikely [56].

Variant	Therapeutic Modality
Anterior	Sensory tricks
	Distracting tasks
	CBT for anxiety control
	Verbal cues
Posterior	Botulinum toxin A
	Clonazepam
	Visualization strategies
	Spatial recognition tasks
Abbreviation: CBT, Cognitive Behavioral Therapy.	

Table2TreatmentModalitiesDescribedinDifferentAlienHandvariants.

Abbreviation:CBT,CognitiveBehavioralTherapy.

Thetext suggeststhatpatientmanagement forAHS variantsshould concentrateon identifying functional deficitsand employing a multidisciplinary treatment approach. It advocates fortreating anxietyand fearwith behavioraltherapies insteadof relyingonlyon antibiotics. For movement issues, effective strategies include using botulinum toxin, distraction, limb restraint, or hand rehabilitation if feasible. Physical and occupational therapiesareimportantinterventionsforhelpingpatientsandtheircaregiversadjusttonew limitations caused by movement disorders [57].

Conclusion

This studyreviews currentresearch onrare AHSdisorders, emphasizingtheimportance of distinguishing between mental disorders. Important treatments and strategies to improve qualityoflifearealsoincluded.Futurestudiesshouldbeexpandedtoincludemoresettings, studiesconductedbefore2000,andpatients youngerthan18 yearsofage. AHSSyndromeis a rare mentaldisorderresultingfrom damage to the brain, specificallythe corpus callosum. It has multiple causes,and patients often experiencemore than onehealth problem. Symptoms can range fromintermittent to persistent, and appropriate management requires a collaborativeevaluation.ThereisnospecifictreatmentforAHSsyndrome,but medication andbehavioraltherapycanimprovesymptomsandquality oflife.Their managementisof great importance for preventing diseases suchas obesity, heart disease,and cancer. It is important todistinguish AHS syndromefrom mentalretardation, asboth canpresent with features of abnormal limb movements. Becauseof the wide varietyof etiologiesof AHS syndrome,psychiatricdisordersshouldbecarefully consideredinthedifferentialdiagnosis due to theirimportance. AHS is arare disorder that presents challengesand learning opportunities for healthcare professionals. Understanding AHS is important for proper diagnosis andtreatmentbecauseitaffectsbrainfunctionssuchasmotorcontrolandmemory. ResearchonAHSmayimproveourunderstandingofotherneurologicaldiseases.Although AHS is arare condition, it has important implications for patient care and highlights the need for personalized treatment. Continued research and monitoring of AHS treatments is important for improving mental health and mental health care [58].

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