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RESEARCH ARTICLE

AN AYURVEDIC METHODOLOGY FOR MANAGING DIABETIC DYSLIPIDEMIA - A CASE REPORT

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Abstract

Diabetic dyslipidemia is characterized by elevated plasma triglyceride levels, decreased HDL cholesterol levels, and an increase in small dense LDL-cholesterol particles. These lipid alterations in diabetes are linked to heightened free fatty acid flux due to insulin resistance. With the availability of various lipid-lowering medications and supplements, patients now have more options to reach target lipid levels. Lipid-lowering therapies in modern medicine, such as statins and fibrates, are generally well-tolerated with minimal side effects. However, these treatments often necessitate lifelong usage, which can impose significant financial strain, particularly in developing countries like India. In Ayurveda, dyslipidemia is understood as the manifestation of an imbalance in the Medovahasrotas. Dyslipidemia manifests as the consequent output of Medovahasrotodushti. A 31-year-old male patient presented with complaints of pain in calf muscles and weight gain. Upon investigation, his total cholesterol level was found to be elevated at 211 mg/dl, and triglycerides were elevated to 683.80 mg/dl. Giloykwath along with arjunktawth, Madhunashinivati extra power, Tablet lipidom, and Tablet Madhugrit were administered for the shaman therapy. Upon completion of the treatment, significant improvements were observed in the patient's complaints. Additionally, a significant improvement was noted in the Lipid Profile.

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Introduction:-

The progression of technology, busy lifestyles, sedentary habits, and dietary changes have heightened individuals' susceptibility to various lifestyle disorders, with Diabetic Dyslipidemia emerging as a prominent example. Approximately 30-60% of individuals diagnosed with type 2 diabetes mellitus (T2DM) are estimated to experience dyslipidemia[1]. This prevalent metabolic abnormality, often associated with diabetes, is characterized by quantitative and qualitative changes in lipids and lipoproteins. One typical manifestation, termed diabetic dyslipidemia, involves elevated triglyceride levels, decreased concentrations of high-density lipoprotein (HDL)-cholesterol, and a shift towards small, dense low-density lipoprotein (LDL)[2].

In Ayurveda, diabetic dyslipidemia can be correlated with medovahasrotodushti. Medas, one of the saptadhatu, is the fourth dhatu formed from the essence of āhāra rasa and has a maternal origin. Its principle function is the

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impartation of snehabhāva (unctuousness). Rasa, when solidified, converts to mamsa, which, when acted upon by mamsadhatvagni—dominated by agni, ap, and snigdha—transforms into medas. Consequently, medas is inferred as 'lipids,' and MedaDhatu as adipose tissue [3].

Medas' function is also stated as bringing about corpulence and strength due to its guru - snigdha nature. Medodushtilakshana, as outlined in Ayurvedic classics, include symptoms such as Snigdhangata, udara-pārsvavidhi, kāsa, shwas, and dourgandyam. Specific causes contributing to the vitiation of medovahasrotas include lack of exercise, daytime sleeping, consumption of fatty foods, and excessive alcohol intake. These factors have a direct effect on Kapha Pitta vitiation, which, in turn, contributes to the manifestation of Santarpanottavyadhi[4].

Bahu and abadhamedas are explained as dushyavishesha in pramehanidāna, where aggravated Kaphadosha first mixes with meda, which is in surplus, non-compact form, and similar in properties to kapha. In the context of the nidāna of Madhumeha, aggravated medas is said to obstruct the path of vata, leading ojas to vastipradesha[5].

The liver plays a pivotal role in lipid metabolism, aiding in the synthesis of VLDL, HDL, TG, cholesterol, and in the synthesis and oxidation of fatty acids. Hormones of the anterior pituitary, such as GH and ACTH, promote the mobilization of fat depots, increasing lipolysis and fatty acid metabolism. Insulin facilitates the formation of fat from glucose, its deposition in adipose tissue, and prevents its breakdown. Thyroid hormones influence all major metabolic pathways by increasing basal energy expenditure through lipid, protein, and carbohydrate metabolism, affecting the synthesis, mobilization, and degradation of lipids. The suprarenals also aid in lipid metabolism via hormones of the cortex and medulla[6].

Alterations in lipid metabolism clinically present as dyslipidemia, a significant risk factor for developing atherosclerosis and heart disease. Symptoms of altered lipid metabolism manifest in conditions such as obesity, Type 1 and 2 diabetes, hypothyroidism, Cushing's syndrome, certain types of renal failure, and certain cancers. Dietary factors such as intake of fats, especially saturated fats, which account for almost 40% of total calories, and cholesterol-rich foods, as well as habitual alcohol consumption, are implicated in altered lipid metabolism. Epinephrine, with its potent lipolytic action, plays a crucial role, and its impairment is implicated in the pathogenesis of obesity. The renin-angiotensin mechanism can lead to hypertension and insulin resistance if activated in adipose tissue. Intramyocellular lipids (IMCL) are valuable energy stores, but in the absence of exercise, along with overconsumption of fat, they are positively correlated with obesity and have detrimental effects on muscular insulin sensitivity. Metabolic syndrome, defined as a conglomerate of conditions like hypertension, hyperglycemia, dyslipidemia, and increased fat around the waist occurring together, increases the risk of heart disease, stroke, and diabetes. Recent studies on metabolic syndrome, hyperlipidemia, atherosclerosis of blood vessels, fatty liver, and fatty kidneys demonstrate obesity's contributory role. Centuries ago, Ayurvedic classics precisely explained this morbidity of Medovahasrotas, expressed as Pramehapoorvaroopta and sthoulyalakshana, with its complications in chronic long-standing cases[7].

Material and Method

A 31-year-old male patient residing in Dehradun sought treatment at Patanjali Ayurvedic Hospital, Haridwar, in the outpatient department of Kayachikitsa in October 2023. He had previously been diagnosed with diabetes and dyslipidemia and presented with complaints of calf muscle pain persisting for three months, accompanied by weight gain and fatigue over the past year. Additionally, he reported experiencing acidity and indigestion for the past month. Laboratory tests revealed elevated total cholesterol and triglyceride levels, along with high random blood glucose levels. The patient also had a history of alcohol consumption spanning ten years.

He was prescribed the following oral medications for a duration of one month: Arjun Kwath and Giloy Kwath, Madhunashini Vati Extra Power, Lipidom tablets, and Madhugrit tablets.

s.no.	Drug prescribed	Dose	anupana
1.	Arjun kwath + giloykwath	100 ml x bd before meal	-
2.	Tab. Madhunashinivati extra power Tab. lipidom	2 tab x bd before meal	Lukewarm water
3.	Tab. Madhugrit	2 tab x bd after meal	Lukewarm water

Arjun kwath-

Terminalia arjuna (Roxb.) Wight and Arn., commonly referred to as 'Arjuna', is a medicinal plant indigenous to India with a rich history of therapeutic applications. Recognized as a cardi tonic, Arjuna has been traditionally utilized in the management of heart failure, ischemic conditions, cardiomyopathy, atherosclerosis, and myocardial necrosis. Additionally, it has been employed for addressing various human ailments such as blood disorders, anemia, venereal and viral diseases. Beyond cardiovascular health, Arjuna finds utility in treating fractures, ulcers, hepatic conditions, and exhibits a wide array of pharmacological properties including hypocholesterolemic, antibacterial, antimicrobial, antitumoral, antioxidant, antiallergic, antifeedant, antifertility, and anti-HIV activities.[8]

Giloykwath-

Sharma et al. reported significant hepatoprotective effects of *Tinosporacordifolia* water extract (TCE) against hepatic and gastrointestinal toxicity. In alcoholic samples, there was a notable increase in gamma-glutamyltransferase, aspartate transaminase, alanine transaminase, triglyceride, cholesterol, HDL, and LDL levels ($P < 0.05$), which were subsequently downregulated following TCE intervention, leading to normalized liver function. Additionally, in one study, *T. cordifolia* demonstrated hepatoprotective properties by markedly improving clinical and hemato-biochemical markers of CCl₄-induced hepatopathy in goats. *T. cordifolia* extract also shielded the livers of CCl₄-toxic mice, with a significant decrease observed in serum levels of SGOT, SGPT, ALP, and bilirubin post-intoxication. The herb is attributed with numerous pharmacological properties, including immunomodulation, anti-diabetic, antifungal, and hepatoprotective effects." [9]

Madhunashinivati extra power –

Madhunashinivati is made up of several medicinal herbs

Turmeric (Curcuma longa) –

The active compound in turmeric, curcumin, has garnered attention as a promising treatment for diabetes and its complications, mainly due to its safety profile and cost-effectiveness. Research indicates that curcumin acts as a potent agent in reducing glycemia and dyslipidemia in rodent models of diabetes.[10]

Kutki (Picrorhizakurroa) - Referred to as 'Kutki' in classical Ayurvedic texts, *Picrorhizakurroa* has long been utilized as a remedy for diabetes. Previous preliminary studies have corroborated its antidiabetic effects in rats, showing a significant reduction in elevated fasting blood glucose levels and effective control over dyslipidemia.[11]

Chirayata (Swertiachirayita) –

Among various herbal plants, *Swertiachirayita* stands out for its widespread recognition, particularly for its anti-hyperglycemic properties. It is acknowledged to possess a myriad of therapeutic benefits, encompassing anti-diabetic, anti-inflammatory, hypoglycemic, hepatoprotective, antibacterial, wound-healing, antipyretic, antihelminthic, antioxidant, and antitussive effects.[12]

Gudmar(Gymnemasylvestre) -The administration of leaf extracts to hyperlipidemic rats for two weeks has been observed to lead to a reduction in elevated serum triglyceride (TG), total cholesterol (TC), very low-density lipoprotein (VLDL), and low-density lipoprotein (LDL) cholesterol in a dose-dependent manner. The initial scientific validation of *G. sylvestre* use in human diabetics' dates back almost a century, demonstrating that the leaves of *G. sylvestre* reduce urinary glucose levels in diabetic individuals.[13]

Hence, the additional herbs found in MadhunashiniVati, such as jamun, karela, gokhru, methi, harad, amla, and giloy, possess both antidiabetic properties and hepatoprotective qualities.

Lipidom –

Lipidom contains a potent combination of Gallic acid, Protocatechuic acid, Corilagin, Ellagic acid, Cinnamic acid, Guggulsterone E, and Guggulsterone Z. These phytometabolites are recognized for their remarkable antioxidant, anti-inflammatory, and lipid-lowering attributes. [14]

Madhugrit –

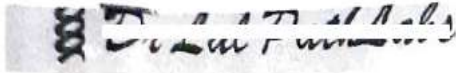
The efficacy of Madhugrit in addressing hyperglycemia and its associated complications is attributed to its rich repertoire of anti-diabetic, anti-inflammatory, antioxidant, wound-healing, and lipid-lowering phytoconstituents.

This study advocates for the translational application of Madhugrit as a potent medicine for diabetes and its comorbidities.[15]

Before treatment

Lipid profile and Blood glucose -

Date	Total cholesterol	Triglycerides	HDL	Non- HDL	Glucose fasting plasma	Hba1c
7/9/23	211.00 mg/dl	683.80 mg/dl	30.70 mg/dl	180 mg/dl	269.60 mg/dl	10.1%



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Name	:		Age	:	31 Years
Lab No.	:		Gender	:	Male
Ref By	:	SELF	Reported	:	7/9/2023 6:06:12PM
Collected	:	7/9/2023 8:49:00AM	Report Status	:	Final
A/c Status	:	P	Processed at	:	LPL-MEERUT LAB
Collected at	:	MUZAFFAR NAGAR CC3 MUZAFFARNAGAR CC3, GALI NO.1, NEAR DR. JITENDRA SINGH RUHELA, SADAR BAZAR, MUZAFFARNAGAR 251001			1st Floor, Hall No. 101, 1st Floor of Shree Ram Commercial Complex, Shraddhapuri, Phase 2, NH-58, Meerut, UP - 250001

Test Report

Test Name	Results	Units	Bio. Ref. Interval
LIPID SCREEN, SERUM			
Cholesterol, Total (CHO-POD)	211.00	mg/dL	<200.00
Triglycerides (GPO-POD)	683.80	mg/dL	<150.00
Advised :- Follow up and clinical correlation. Urgent recheck with a fresh sample in case not correlating clinically.			
Result Rechecked, Please Correlate Clinically.			
HDL Cholesterol (CHO-POD)	30.70	mg/dL	>40.00
Non-HDL Cholesterol (Calculated)	180	mg/dL	<130

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 JITENDRA SINGH RUHELA, SADAR BAZAR,
 MUZAFFARNAGAR 251001

Age : 31 Years
 Gender : Male
 Reported : 6/9/2023 8:35:06PM
 Report Status : Final
 Processed at : LPL-MEERUT LAB
 1st Floor, Hall No. 101, 1st Floor of Shree
 Ram Commercial Complex,
 Shradhdhapuri, Phase 2, NH-58, Meerut,
 UP - 250001

Test Report

Test Name	Results	Units	Bio. Ref. Interval
HbA1c (GLYCOSYLATED HEMOGLOBIN), BLOOD (HPLC, NGSP certified)	10.1	%	4.00 - 5.60
HbA1c	243	mg/dL	
Estimated average glucose (eAG)			

Diabetic patient.

Dr Lal Path Labs

Regd. Office: 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000

Name : Mr. ALOK BARTH WAL
 Lab No. : 440786199
 Ref By : SELF
 Collected : 6/9/2023 9:35:00AM
 A/c Status : P
 Collected at : MUZAFFAR NAGAR CC3
 MUZAFFARNAGAR CC3, GALI NO.1, NEAR DR.
 JITENDRA SINGH RUHELA, SADAR BAZAR,
 MUZAFFARNAGAR 251001

Age : 31 Years
 Gender : Male
 Reported : 6/9/2023 8:35:06PM
 Report Status : Final
 Processed at : LPL-MEERUT LAB
 1st Floor, Hall No. 101, 1st Floor of Shree
 Ram Commercial Complex,
 Shradhdhapuri, Phase 2, NH-58, Meerut,
 UP - 250001


Test Report

Test Name	Results	Units	Bio. Ref. Interval
GLUCOSE, FASTING (F), PLASMA (Hexokinase)	269.60	mg/dL	70.00 - 100.00

After treatment

Lipid profile and blood glucose -

Date	Total cholesterol	Triglycerides	HDL	VLDL	Glucose fasting plasma	Hba1c
24/11/23	182 mg/dl	208 mg/dl	44.5 mg/dl	41.60 mg/dl	103 mg/dl	5.81%



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Dr. Shashank Prateek Garg
M.B.B.S., MD, FOCG

Dr. Priyanka Gupta
M.B.B.S., MD


Patient Name : _____

Age / Gender : 31 years / Male

Patient ID : _____

Source : cc- gumaniswala


Scan to Validate



Referral : _____

Collection Time : Nov 24, 2023, 12:30 p.m.

Reporting Time : Nov 24, 2023, 04:40 p.m.

Sample ID : 

Test Description	Value(s)	Reference Range	Unit
BLOOD SUGAR FASTING			
Result	103	0-7d: 40-100 mg/dL 8d-<1m: 50-100 mg/dL 1m-11m: 50-100 mg/dL 1y-18y: 60-100 mg/dL >19y: 70-100 mg/dL	mg/dL

HbA1c (GLYCOSYLATED Hb)

TYPE OF SPECIMEN : WHOLE BLOOD

Method: Tetradecyltrimethylammonium bromide NGSP approved method

Result	5.81	Normal (nondiabetic): 4.4 - 5.8% Prediabetes: 5.9 - 6.4% Diagnosis of Diabetes: > 6.5%
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Interpretation:
Hemoglobin A1c (glycated hemoglobin) reflects the average blood glucose concentration over the course of the RBC lifespan, roughly 120 days in normal individuals. It provides different, and complementary, information to a single glucose concentration. Hemoglobin A1c should be monitored regularly in diabetic patients. The goal of therapy is to attain a value of less than 7.0% (while minimizing hypoglycemic episodes). For routine clinical use, testing every 3 to 6 months is generally sufficient. In certain clinical situations, such as gestational diabetes, or after a major change in therapy, it may be useful to measure HbA1c in 2 to 4 week intervals.

HbA1c(%)	Mean Plasma Glucose (mg/dL)	
6	126	
7	154	
8	183	
9	212	
10	240	
11	269	
12	298	

LIPID PROFILE

TYPE OF SPECIMEN : SERUM

METHOD : SPECTROPHOTOMETRY, CALCULATION

Total Cholesterol	182	< 200	
Triglyceride	208 ✓	< 150	mg/dl
HDL Cholesterol	44.5	> 40	mg/dl
VLDL	41.60 ✓	< 30	mg/dl

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Discussion

Dyslipidemia stands out as a significant risk factor for cardiovascular disease in individuals with diabetes mellitus. Timely identification and management of dyslipidemia in type-2 diabetes can effectively mitigate the risk of atherogenic cardiovascular disorders. Diabetic dyslipidemia encompasses a triad of elevated triglycerides, diminished HDL cholesterol, and an abundance of small, dense LDL particles. These lipid irregularities are widespread in diabetes mellitus due to the impact of insulin resistance or deficiency on crucial enzymes and pathways in lipid metabolism.

In Ayurveda, diabetic dyslipidemia finds correlation with 'medovahasrotodushti,' wherein the vitiation of medovahasrotas influences the imbalance of Kapha and Pitta doshas, thereby contributing to the manifestation of 'Santarpanottavyadhi.' Consequently, Ayurvedic treatment aims to restore the equilibrium of Kapha and Pitta doshas, enhance metabolism, and stimulate hepatic functions. In this case study, we administered medications that pacify Kapha and Pitta doshas while also possessing anti-diabetic, anti-inflammatory, and hepatoprotective properties."

Result

The patient demonstrated positive progress within four months, with noticeable improvement in his complaints of pain and fatigue. Moreover, his lipid profile and blood glucose levels exhibited significant and marked changes. The patient expressed satisfaction, and no adverse drug reactions were observed throughout the treatment.

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